

MODEL Airplane NEWS

Radio Control Dogfighting

page 94

Almost-ready-to-fly
new generation ducted fan
F-86F Sabre

Building Techniques

- Light, strong airframes
- Functional gun turrets

ENGINE TESTS

ZDZ 40cc gas ignition—
Hot European import

SAITO .72 power-to-weight breakthrough

WE FLY

- Texan—.30-size warbird
- Extra 330L—
1/3-scale aerobat
- Lil Luscomb—
electric easy flyer

DECEMBER 2001

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MODEL Airplane NEWS

DECEMBER 2001 • VOLUME 129, NUMBER 12

Features

30 Holiday Wish List

by the staff of Model Airplane News

36 Midwest Slope Challenge

Hot pursuit over Wilson Lake, Kansas
by Dave Garwood

94 RC Combat

Become a weekend warrior in aerial action
by John S. Reid

104 Engine Review ZDZ 40 RV-L

A powerful, lightweight gasoline engine with rear induction
by Gerry Yarrish



118 How to Scale Gun Turrets

Bringing a WW II bomber to life
by Charlee Smith

Construction

76 Berryloid Trophy Winner

An RC-assist version of an old classic
by Don Carkhuff



Field & Bench Reviews

44 Hangar 9 Extra 330L ARF

Classic competition aerobat
by Jim Onorato

52 MRC/Altech EZ Texan

Classic warbird ARF
by Craig Trachten

60 NE Sailplanes Products Lil Luscomb

Quick-build Sunday flyer
by Vic Bunze

68 Kyosho F-86F Sabre ARF

Pull-start power for a ducted fan!
by Nick Zirolli Sr.



ON THE COVER: main image—coming around for another photo pass, the new Kyosho ducted-fan-powered F-86 ARF shows off its aerodynamic agility. Equipped with a recoil pull-starter .15 glow engine, the Sabre Jet is easy to start and fun to fly.

Columns

14 Air Scoop

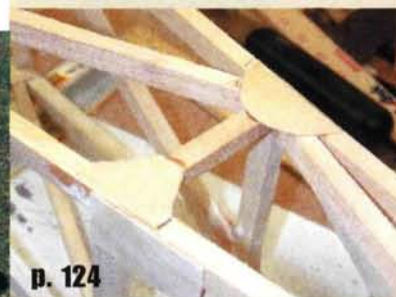
by Chris Chianelli and the staff of Model Airplane News

22 Readers' Tips & Tricks

with illustrations by David Baker

124 Thinking Big

Splicing wood and other construction techniques
by Gerry Yarrish



150 Air Power

Saito FA-72
by Chris Chianelli

186 Final Approach

Electric model crosses Long Island Sound
by Tom Hunt & Henry Prew

Departments

10 Editorial

12 Airwaves

26 Pilot Projects

84 Grassroots

156 Product Watch

172 Name that Plane

174 Classifieds

180 RCStore.com

185 Index of Advertisers

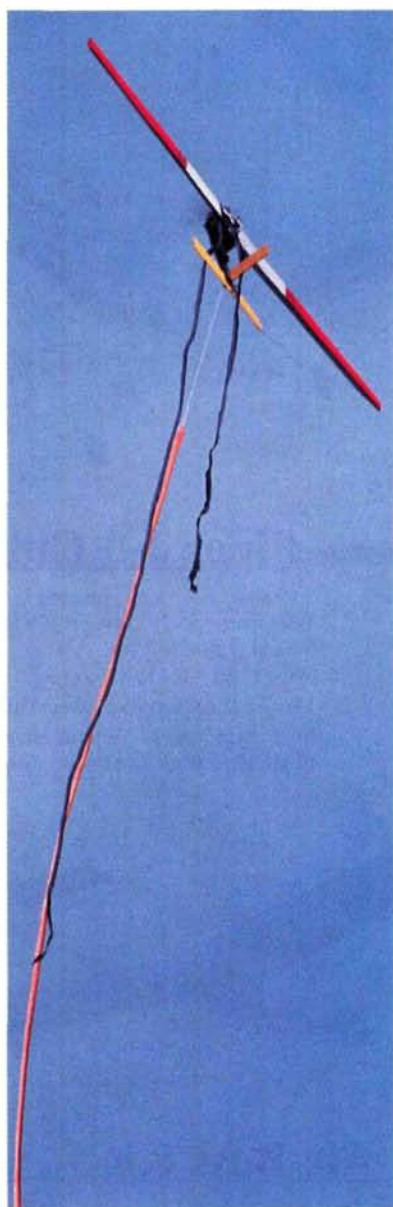
RC combat!

Ever wonder what it would be like to engage an adversary above the clouds? RC dogfighting is as close as you'll get to air-to-air combat while staying safely on the ground, and it's a great way to get your adrenaline pumping. The model reinforcement techniques and fighter strategies provided by John Reid in this month's feature article will help you score your first kill and come back for more. See page 94 for more, and don't forget to check your six!

In the workshop this month, Charlee Smith shares how to build functional RC gun turrets for scale models, and Gerry Yarrish tells how to properly splice wood and add reinforcing gussets to end up with a strong, yet light, airframe. Both of these interesting methods are easier than you may think; check out the articles on pages 118 and 124, respectively.

The original free-flight Berryloid Trophy Winner from 1938 is suspended from the ceiling in the Academy of Model Aeronautics (AMA) museum, and Don Carkhuff breathes new life into this design with his RC-assist version featured in this issue. With a .30-size engine and 3 channels, this model is straightforward to build and easy to fly.

In his "Air Power" column, Chris Chianelli reports on the new Saito FA-72, an engine that represents a real breakthrough in 4-stroke power-to-weight-



ratio technology. Did this powerhouse perform as promised? See page 150.

In another engine review, Gerry Yarrish puts a ZDZ 40cc gas engine through its paces. Not only is this powerplant specifically designed for giant-scale model airplane use, but it also has a rotary disc rear intake, which gives it excellent throttle response at high rpm. For the rest of the story, see page 104.

Our "Final Approach" features a true team effort: the X-Sounder. This electric-powered model was designed and built specifically to cross Long Island Sound (16 miles!) without stopping. Co-author Tom Hunt was one of the key players in the success of this design; he shares an overview of the process and tells of the trip across the Sound. We look forward to publishing a more detailed description of how this incredible design evolved.

The best to you and yours for 2002. ✦

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INSIDE A CUB

I'm building a Sig Mfg. 1/4-scale J-3 Cub, and I want to detail the cockpit—or at least dress it up a bit. I'd appreciate any help or suggestions about where to find some pictures of it. Thank you. [email]

STEVE A. THOMAS



Steve, the last time I looked at it, Sig Mfg.'s catalog offered a photo pack for the Piper J-3 Cub; call them at (800) 247-5008, or check www.sigmfg.com. Also, Bob Banka at Aircraft Documentation has several photo packs available for the venerable J-3 Cub. You can reach Bob at (714) 979-8085.

Another avenue is to search the Internet for

sites that have pictures of Piper Cubs. Several full-size aircraft organizations have a Web presence, and it just takes a little surfing to find what you're looking for. If you want to build your own panel, a good supply of scale Piper Cub instruments can be obtained from Jerry Nelson of Nelson Aircraft Specialties, (503) 629-5277; www.nelsonhobby.com. Have fun detailing your Cub.

GY

FINDING FUN-FLY PLANES

This is the second season that I've been involved with model airplanes. My second plane was a Great Planes G-202, and I want something more responsive that can hover. In the October 2001 issue of *Model Airplane News*, I saw a picture of two airplanes hovering in Don Edberg's "Effective Programming" column. What type of planes were they? I really like the idea of less expensive models, rather than having to spend thousands on a 40-plus-pounds, 3D-style model. I really enjoy reading Don's column; I've found it to be very

helpful and informative. Keep up the good work! [email]

PIPERCUB

The "stick-and-boom" models in that photograph are typical of competition fun-fly airplanes of the mid-'90s. Several manufacturers have introduced a new generation of models that have a minimal fuselage cross-section and a thick airfoil. Some we've seen recently include the Balsacraft Limbo Dancer from Great Planes (www.greatplanes.com), the Horizon Hobby Inc. Pizazz ARF (www.horizonhobby.com) and the Model Tech Magic from Global Hobby Distributors (www.globalhobby.com). For more information on competition fun-fly events, check out the National Competition Fun Fly Association website at www.ncffafunfly.com.

DS

ENGINE BEARING REPAIR

I have a three-year-old Moki 1.8. It starts very easily, runs very reliably and has plenty of power. The other day, however,



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the engine suddenly and abruptly stopped in mid-flight. The front bearing had failed, and a small piece of steel from it had lodged at the very front of the crankcase housing, between the housing and the crankshaft. This caused only very minor damage to the aluminum crankcase housing just behind the front bearing. I used some 600-grit sandpaper and a mild detergent/water mixture for lubrication on the inside of the housing where the minor damage occurred, and it is like new. The crankshaft itself sustained no damage at all. The larger rear bearing seems fine, but I figured as long as I had the front part of the crankcase unbolted from the back part of the engine, I would change out both bearings. (I had acquired replacement bearings from a local supplier.) However, the bearing supplier did not have "open-face" (if this is even the correct term) bearings like the ones that were originally installed in the engine by the manufacturer; the ones I used are sealed. The two sealed bearings are of very good quality. My question is, is it better or worse to use sealed bearings rather than the original, "open-face"-type bearings, or does it make any difference at all? [email]

D. GIBBS

The seals won't hurt anything, so you can install them as is; the grease will simply wash out during engine operation. If you don't like the slight frictional drag produced by the seals, simply remove them. Pry them from their seats with a tiny (jeweler's) slot-type screwdriver or a hobby knife (use a no. 11 blade). Be careful not to touch—and possibly damage—the ball bearings in the process; not likely, since you'll be careful! The grease can then be washed out with solvent. I like lacquer thinner, since it doesn't attract rust-producing water from the air (hygroscopic action, as with alcohol-based solvents). Allow the bearings to dry naturally (don't use compressed air to hasten drying because dirt in the airstream can contaminate the bearing assembly). Lubricate with Marvel Mystery Oil and install the sealed bearings in your Moki.

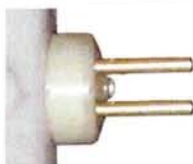
DAVE GIERKE

DECAL DILEMMA

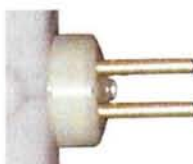
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RALPH ENGLERT

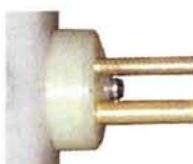
All Stopped Up.



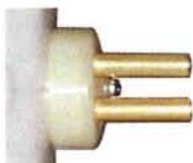
Standard Glow Fuel Stopper Assembly Kit
with 1/8" Feed and Vent Tubes
S482



Standard Gasoline Stopper Conversion Kit
with 1/8" Feed and Vent Tubes
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and Pro-Mark offer dry-transfer graphics; you can reach them at (602) 649-8662; www.aeroloft.com, and (618) 524-2440; www.pro-mark.com, respectively. Give these guys a call; we're sure you'll find exactly what you're looking for.

GY ✦



AIR SCOOP

BY CHRIS CHIANELLI AND
THE STAFF OF MODEL AIRPLANE NEWS

New products or people behind the scenes: my sources have been put on alert to get the scoop! In this column, you'll find new things that will, at times, cause consternation, and telepathic insults will probably be launched in my general direction! But who cares? It's you, the reader, who matters most! I spy for those who fly!

Ripmax

Two New British Imports

With the introduction of two new models, the British company, Ripmax, proves that its planes can easily cross the Atlantic, even when they're only almost-ready-to-fly (ARF). The Ripmax Zephyr is a versatile beginner sport plane that flies equally well with glow or electric power. It features vintage styling and slow, steady flight characteristics. The Zephyr comes nearly completely built and covered and includes a full set of control hardware. It weighs 3 pounds, has a wingspan of 62 inches and is priced at \$179.99.



Intermediate-level pilots will love the Alliance, a replica of Christophe Paysant-LeRoux's world championship model. This electric aerobat is made entirely of ultralight foam to minimize weight. The Alliance's wing is constructed of a new form of high-strength foam that can withstand the stresses of the thrilling aerobatic maneuvers it's capable of performing. The Alliance weighs 1.7 pounds, has a wingspan of 42.7 inches and is capable of 6-minute flight times on a geared 480 motor. It sells for \$159.99.

Ripmax; distributed in the U.S. by Great Planes Model Distributors Co., P.O. Box 9021, Champaign, IL 61826; (800) 682-8948; fax (217) 398-0008; www.greatplanes.com.



O.S. Engines .50 SX Ringed Airplane Engine

Most of us at one point or another have desired more power than a .46-size engine can provide, but who feels like wasting time trying to enlarge the mounting space to accommodate a bigger engine? O.S. has the answer. The new .50 SX ringed airplane engine turns out 10 percent more horsepower than a .46 engine but requires no mounting adjustments. The .50 SX features low-drag, high-speed dual ball bearings and a universal fuel inlet nipple that can be rotated for easier access. The one-piece metal remote needle valve can be positioned vertically or horizontally to adapt to in-cowl or side-mount applications, and the ringed construction translates to a long life for your engine.

The .50 SX comes with an O.S. 873 muffler and sells for \$299.99.

O.S. Engines; distributed by Great Planes Model Distributors Co., P.O. Box 9021, Champaign, IL 61826; (800) 682-8948; fax (217) 398-0008; www.osengines.com.



E-Flite

Maxx 25 ESC



If you're looking for a high-quality electronic speed control to complement your Speed 400 or 550 motor, then look no further than E-Flite's new Maxx 25. The Maxx 25 can handle up to 25 amps of continuous current and comes prewired with a Tamiya connector and bullet-style motor connector. It also has an arming switch, thermal protection, polarity protection and an automatic shutoff feature. It can be yours for only \$29.99.

E-Flite; distributed by Horizon Hobby Inc., 4105 Fieldstone Rd., Champaign, IL 61822; (217) 355-9511; www.horizonhobby.com.

Designed specifically for the serious electric enthusiast in search of a plane with high-performance, aerobatic ability, the WattAge Crazy 8 has enlarged control surfaces and a powerplant that allows it to really tear up the sky. It's constructed entirely of lightweight balsa and ply and covered with iron-on covering, and because WattAge knows that modelers prefer different powerplants, the Crazy 8 can run on any of the Speed 400 to 480 motors on the market with either a gear drive or a direct drive. The Crazy 8 has a 31½-inch wingspan, weighs between 24 and 30 ounces and will most likely sell for less than \$100.

WattAge; distributed by Global Hobby Distributors, 18480 Bandilier Cir., Fountain Valley, CA 92728; (714) 964-0827; fax (714) 962-6452; www.globalhobby.com.

WattAge

CRAZY 8



AIR SCOOP

Great Planes

SPECTRA SELECT RTF

Sometimes there's nothing better than being able to take a plane out of the box and head straight to the field. If sailplanes tend to pique your interest, this one's for you. The Great Planes

Spectra Select ready-to-fly 2-meter sailplane comes already assembled and covered, with a motor and a complete, high-quality radio system already installed. The powerful 550-size motor delivers enough thrust to propel the plane up to 500 feet, which gives you plenty of soaring time. The included 8x4 prop folds back against the fuselage when the motor is turned off to streamline the nose and reduce drag, and the wing's triple-taper airfoil features a mild semisymmetrical design that increases stability for smooth, stable flight. The Spectra Select RTF sells for \$279.99.

Great Planes Model Distributors Co., P.O. Box 9021, Champaign, IL 61826; (800) 682-8948; fax (217) 398-0008; www.greatplanes.com.



Hobby Lobby

Sortakhoi & Aventura II

The almost-ready-to-fly (ARF) Sortakhoi combines the great looks and feel of a jet with the ease and convenience of a park flyer—a great idea! Running on a Jeti Phasor 15/3 motor, the Sortakhoi looks and flies like a jet, but it can also land at slow speeds and fly in confined spaces like a park flyer. Constructed entirely of lightweight balsa and covered in Oracover, the Sortakhoi is 40 inches long, weighs 2 pounds, 3 ounces and has a 33-inch wingspan. It sells for \$129.

Whether you prefer fighters or seaplanes, Hobby Lobby has something to suit you. Designed for a Speed 400 motor, the Aventura II Flying Boat is the perfect floatplane for that neighborhood pond. The Aventura has already built and covered wings, and its white, fiberglass fuselage has a large frontal planing surface to ensure good water takeoffs. The Aventura weighs 28 ounces and sells for \$128.

Hobby Lobby Intl., 5614 Franklin Pike Cir., Brentwood, TN 37027; (615) 373-1444; fax (615) 377-6948; www.hobby-lobby.com.

Horizon Hobby

Hobby Zone Firebird II

It seems we park-flyer enthusiasts just can't get enough of the Horizon Firebird, and the folks at Horizon are working hard to meet our demands. Along with the newly released Firebird XL, Horizon Hobby proudly introduces the brand-new Firebird II. This newest Firebird has the same body as the original but sports a sleek, new, dihedral wing that doesn't need wing braces and also has an enlarged tail for better control. A more efficient motor can provide flights of up to 18 minutes on a calm day, and an optional Speed Wing and 5-cell, 6V 600mAh NIMH Speed Battery (sold separately) provides even better performance. The Firebird II sells for \$99.99.

Horizon Hobby Inc., 4105 Fieldstone Rd., Champaign, IL 61822; (217) 355-9511; www.horizonhobby.com.



HorizonsNZ Scale Instruments

Anyone who has ever attempted to build a truly scale airplane knows that when it comes down to it, those cockpit graphics can make or break a model—enter Greg Thompson and HorizonsNZ model graphics. Greg draws high-quality, true-to-scale instruments and equipment and prints them on premium inkjet paper. He recently released his first sets to the market through Rider's Hobby Shops and R/C Motorsports. He will work with you directly to develop custom graphics for individual projects, or he can scale his stock graphics to any size you require. Prices vary depending on the amount of work needed; simple panels are priced as low as \$5, and more complex, customized designs cost about \$60.

HorizonsNZ, 1720 Apple St., Portage, MI 49002; horizonsnz@hotmail.com.

With the introduction of the Raptor 60 Version 2.0, the folks at Thunder Tiger continue to make their mark on the expanding

helicopter market. Thunder Tiger made so many improvements to its already popular Raptor 60 heli that the new model had to be given a new name. Version 2.0 features: improved one-way autorotation bearing/sleeve, a rotor-grip spacer for fiber blades, additional canopy stay assembly, additional tail-rotor shims, improved main-rotor hub, a new set of tail bevel gears, a new set of tail hub screws, a new elevator arm link, a new flybar control rod and a new washout link. Best of all, it still sells for the same price as the original: \$599.99 (kit); \$699.99 (ARF without engine); \$869.99 (ARF with .70 engine).

Thunder Tiger; distributed by Ace Hobby Distributors Inc., 116 W. 19th St., Higginsville, MO 64037; (660) 584-7121; www.acehobby.com.

Thunder Tiger

NEW HELI



Sky Hooks & Rigging

Park Fighters

If you've ever dreamed of re-creating a WW II air battle in your backyard—and let's face it, who hasn't?—here's your chance. The folks at Sky Hooks & Rigging may have created their new line of S400 warbirds especially for dogfight lovers like us. These *fx* Park Fighters have a 31-inch wingspan, weigh about 16 ounces ready to fly and are designed to run on Speed 400 motors. Available as a Japanese Zero, a P-51B Mustang, a P-40 Warhawk and an ME-109, the planes are constructed entirely of balsa and medium-density foam and are covered with light fiberglass cloth for a structural skin. The planes come with all of the necessary hardware. The models are available as kits only (\$65) and as package deals (\$225) that include everything you need to get them in the air except glue, paint, a charger and a transmitter.

Backyard combat isn't the only dream of mine that the folks at Sky Hooks have been busy fulfilling. How would you like a receiver and speed control in one small package? The Sky Hooks & Rigging RX72-N Hybrid is unique in that it's actually a receiver with a speed control built right into the unit. The speed-control feature has selectable throttle cutoff points and can draw up to 7 amps of continuous current. The receiver has single-channel discrimination, so it automatically reads which transmitter you are using and where the throttle should be. The entire unit weighs 5.5 grams and sells for \$135.

Sky Hooks & Rigging, 2206 Towne Blvd., Oakville, Ontario, Canada L6H 5H4; (905) 257-2101; fax (905) 257-0168; www.microrc.com.



OFNA

Charger King Ck-201

Proper battery maintenance is particularly important for the small cells that power backyard and park flyers. The key to that is a good charger. OFNA's new Charger King Ck-201 is a multipurpose AC/DC charger that is well suited to a variety of charging and discharging tasks on packs of 1 to 10 cells. It is adjustable from 0.5 to 5 amps in fast-charge mode, and it has a sensor that automatically detects the cell type and number when the pack is connected to it. The auto-selectable discharge rate varies between 0.3 and 2.5 amps. The Ck-201 has built-in voltage minimum and overload, overheating and reverse-polarity protection. A single switch allows the user to select among fast charge, trickle charge, discharge and cycle modes. The Ck-201 is available from OFNA for \$299.

OFNA, 22692 Granite Way, Ste. B, Laguna Hills, CA 92653; (949) 586-2910; fax (949) 586-8812; www.ofna.com.

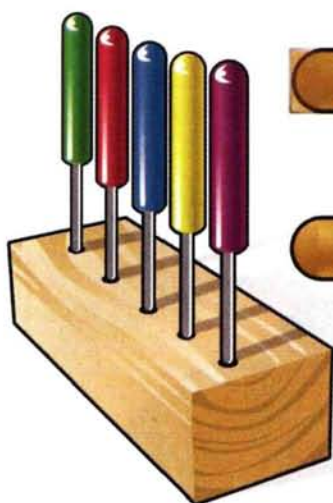


SEND IN YOUR IDEAS. *Model Airplane News* will give a free, one-year subscription (or one-year renewal, if you already subscribe) for each idea used in "Readers' Tips & Tricks." Send a rough sketch to *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we can't acknowledge each one, nor can we return unused material.

SAVE FUEL AND THE ENVIRONMENT

Fuel is expensive, and the environment is priceless; save both by building yourself a fuel catch can. Having your fuel-tank overflow line empty into your muffler means you have to wait until fuel trickles out onto the ground to know that your tank is full. You can avoid this by taking a clear plastic bottle (such as those used for holding spices) and drilling two holes in its lid. Install a pressure fitting in each hole and attach a length of fuel tubing to each—one 4 inches long and the other 1 inch long. Insert a fuel probe into the 4-inch piece. When you fuel your plane, detach the overflow line from your muffler and connect it to the catch can. When you see fuel start to collect in the can, you know your tank is topped up. Disconnect the overflow line and reattach it to the muffler, then insert the open end of the fuel probe into the 1-inch tube segment on top of the can; that makes a closed loop and seals the can.

Steve Wissink, Pickett, WI



FILE HANDLING

Needle files are very useful for detailing small model parts, but their narrowness makes them difficult to hold comfortably. Make handles for them out of 1/2-inch-diameter dowel. Cut the dowel into 2 1/2-inch segments, and in one end, drill an 1/8-inch-diameter, 3/4-inch-deep hole.

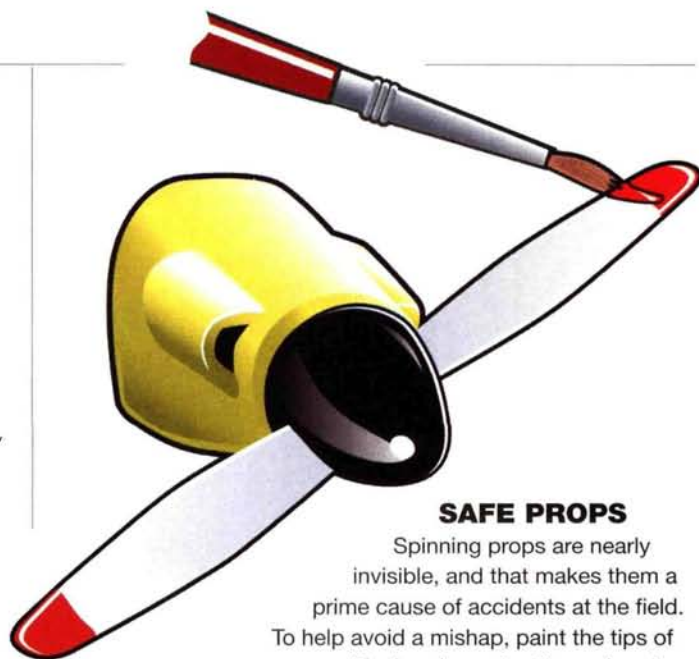
Chuck the dowel in a drill press and spin it while you sand its end round with coarse sandpaper. Then insert the tang end of your needle file into the hole, and secure it with instant glue. As a bonus, you can color-code the handles for ease of identification.

Jay Wallace, Ashland, OR

SPACE SAVER

For many modelers, workshop storage space is at a premium. Everybody knows you should store small items such as screws, washers, pins, etc., in jars to keep them organized, but those jars take up valuable shelf space. To reclaim that space, glue or screw the jar lids to the underside of your workshop shelves (use silicone RTV glue). When you screw the jars closed, they hang out of the way but are still easily accessible.

Robert Patterson, Point Pleasant, WV



SAFE PROPS

Spinning props are nearly invisible, and that makes them a prime cause of accidents at the field.

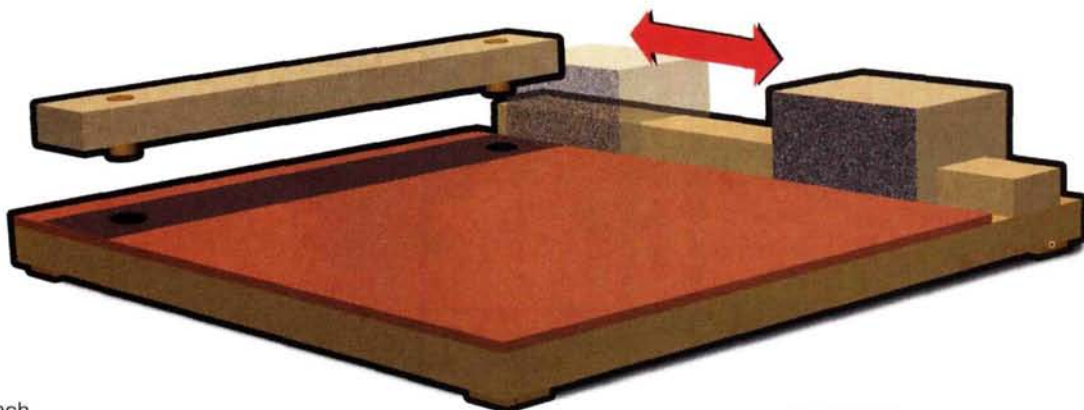
To help avoid a mishap, paint the tips of your prop with sharply contrasting colored stripes, black and yellow work well. Remember to balance your prop after you've painted it.

Justin Felderhoff, Montgomery, TX

STRAIGHT SANDING

Precise angles can make a world of difference to the strength of your plane. Sanding by hand can be tiring, and it can be tough to get the angles perfect. Instead of eyeballing it or having to stop and check your work with a square after every few strokes, make yourself a sanding jig. Make the base out of $\frac{3}{4}$ -inch plywood covered by an $\frac{1}{8}$ -inch-thick slab of Masonite for durability. Fasten a length of plywood alongside the Masonite to serve as a guide rail. Make sure you have a slight gap between the rail and the Masonite and that their edges are perfectly aligned. Cut a notch in a plywood block to match the rail's cross-section, and make sure it slides smoothly along the rail. Glue sandpaper to the side of the block. To make the removable fence, sink two $\frac{3}{8}$ -inch-diameter dowels into a second piece of plywood, and drill holes in the jig's base for the dowels to fit into.

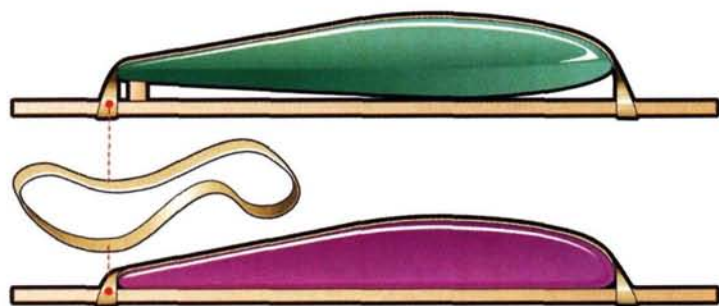
Jay Wallace, Ashland, OR



NO-DRIP FUEL TIP

Working on a plane that has recently had fuel in it can be messy. To reduce clean-up time, take a $\frac{3}{4}$ -inch-long piece of tightly fitting brass tube, and slip the ends of the pressure line and the feed line onto it. This will prevent fuel from dripping out of the carburetor when you turn your plane over to work on it.

Joseph Kazakavage, Sebastian, FL



STRAIGHT WINGS

Sometimes, a model tends to roll one way or the other, even though its wing incidence looks OK. A simple way to verify that everything is aligned properly is to attach four straight sticks that are about 24 inches long to the underside of your wing panels, two per side. Use rubber bands to secure the sticks and see whether all four line up properly. If one points slightly upward or downward, you have found the source of your problem.

This technique is also useful to check that the wings have equal amounts of washout. If you have a convex wing, use shims to make sure your sticks are level.

W. O. Weiss, Meridian, ID

HOMEMADE CHOCKING PANEL

Holding a model securely on your workbench, at the field, or during transportation can be a real challenge. Make a chocking panel out of a 2-foot-square piece of plywood. With a saber saw, cut closely fitting holes to match the positions of the model's wheels. For extra security, you can fashion tie-downs around the holes. The plywood is large enough to accommodate several sets of holes for a variety of models, and it will hold a plane down on the bench, at the field and in the trunk of a car.

Dave Seale, Dedham, MA



PILOT PROJECTS

A look at what our readers are doing



BUCKEYE BEAUTY

Philip Stribny of Northwood, OH, sent us this photo of his Super Sportster 40 MK II that he built from a Great Planes kit. Philip powers his Sportster with an O.S. .70 Surpass engine and controls it with a Futaba 6XA radio. It's finished entirely with MonoKote, including the decals. According to Philip, his 6-pound model flies pretty well at low speeds and only requires full throttle when performing vertical maneuvers.



CLIPPED-WING KADET

This Sig Kadet comes to us from Dan Lucas of Nampa, ID. "Aerolux" is powered by an O.S. .46 engine and uses five servos for control. Dan bashed the Kadet kit into a clipped-wing tail-dragger of his own design. He says it has been his most enjoyable building experience to date. We think it looks like it might be a pretty good time in the air, too.

SCALE SQUADRON

Ruperto Asiatico of Virginia Beach, VA, says his three warbirds are quite a sight on the flightline together, but can you imagine how great they'd all look in the air? Ruperto added many scale details to his World Models' Mustang and Corsair and his Global Hobbies Spitfire to achieve this authenticity. He used LustreKote paint for the camouflage, vinyl trim and MonoKote for the markings and carved balsa for the underwing scoops, gun blisters, gun sights and wing-root intakes. The machine guns and cannons are made of thick plastic tubing. Panel lines and retracts finish off these scale beauties, and the Corsair even has functional bomb drops. The P-51 and the Spitfire are powered by O.S. .46 FX engines, while the Corsair runs on an O.S. .61 FX.



SEND IN YOUR SNAPSHOTS. *Model Airplane News* is your magazine and, as always, we encourage reader participation. In "Pilot Projects," we feature pictures from you—our readers. Both color slides and color prints are acceptable but please do not send digital printouts. We receive so many photographs that we are unable to return them.

All photos used in this section will be eligible for a grand prize of \$500, to be awarded at the end of the year. The winner will be chosen from all entries published, so get a photo or two, plus a brief description, and send them in!

Send those pictures to "Pilot Projects," *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877-4606 USA.



SCRATCH-BUILT SKYBOLT

Robert Coats of Zebulon, NC, scratch-built this 21-pound colorful creation from a Hostetler plan. Could he have picked any better decals for a plane called the "Skybolt"? Robert's model is powered by an O.S. FT-300 twin engine, and he controls it with a Futaba radio. He covered the plane entirely with MonoKote to give it that beautiful finish. Nice work, Robert!



PAIR OF PROFILES

Ted Clark of Fruitland, MD, built this pair of fabulous flyers. Both the Fun 51 and the Ultimate are covered with MonoKote, and both are controlled by Futaba radio equipment. As expected, the difference can be found in Ted's methods of powering his planes; the Fun 51 runs on a Tower .46 engine, while an O.S. .46 engine powers the Ultimate. According to Ted, both his profile planes are excellent flyers and very responsive.

PILOT PROJECTS

EXTRA-ORDINARY!

Check out this Great Planes .60-size Extra 300S! It belongs to Dave Hamblin of Batavia, OH, who finished his model to match the color scheme of the Extra flown by Patty Wagstaff in 1999. Dave's Extra is powered by a Saito 1.20 4-stroke engine and controlled by a JR 8103 radio. It's covered with 21st Century white fabric and Top Flite LusterKote paint. For the finishing touches, Dave added Die-Hard Graphics decals and a Virtual Reality custom pilot, both of which add to the plane's nice, scale appearance.



REBEL ROYAL

This Boeing PT-17 represents Joseph Chadwick's first attempt at building a scale RC plane. Joseph, who hails from Deer Park, TX, built this 68 3/8-inch-wingspan model from a Royal kit and covered it with MonoKote. The plane weighs more than 13 pounds and is powered by a Saito FA-120S engine that is hidden inside the handmade dummy engine. According to Joe, who's a member of the Bayport Aero Club, his biplane flies very well.



NEED FOR SPEED

According to Scott Robison of Charleston, IL, this Progressive Aviation Flying Machine is the fastest, most responsive airplane he's ever flown—and Scott has been flying for 13 years. Scott's model has a 44-inch wingspan and runs on an O.S. .40 FX engine with a Mac tuned pipe turning a 9x7 prop. Scott just can't say enough about his plane's aerobatic ability, and he says he's even seen it reach speeds of up to 140mph. Easy there, Scott! Pictured with the plane is Scott's four-year-old son, Ryan, who, believe it or not, is already learning to fly.





RECON

**IMAA LEGAL SEMI-SCALE KIT
OF THE TWIN ENGINE
CESSNA 02 SKYMASTER
WE FLEW IN
VIETNAM.**

Fuselage is built from laser cut balsa & ply. Outer wing Panels are sheeted foam.

Complete with all accessories, two fuel tanks, two motor mounts, two quality cowls, dural aluminum main gear, scale like nose gear, wheels, interior seats, and two sets of decals for either the Navy or Air Force version.

CESSNA 02 SKYMASTER

Only \$269.95*

Wing Span	87"
Length	60"
Weight	11.5-13 lbs.
Servos	4-6
Engines	.46-.60 2S x 2 .70-.90 4S x 2

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(800) 862-7196

**Price does not include shipping.*

Actual Model Shown



DEDICATED TO DETAILS

Bill Thurman of Buckhannon, WV, sent us this photo of his Bruce Tharpe Engineering "Flyin' King." Built by Mark Sirianni, this 80-inch-wingspan model is equipped with a functional bomb/parachute door, flaps and RAM landing, navigation and interior lights. Bill says it's quite a sight to watch this model approach a landing after dark. A Magnum XL-91 4-stroke engine powers Bill's plane, and a Futaba Super 7-UAP PCM radio with 3001 servos provides control. According to Bill, who covered and finished the model himself, the "Flyin' King" would make a great trainer.

FANTASTIC FLOATER

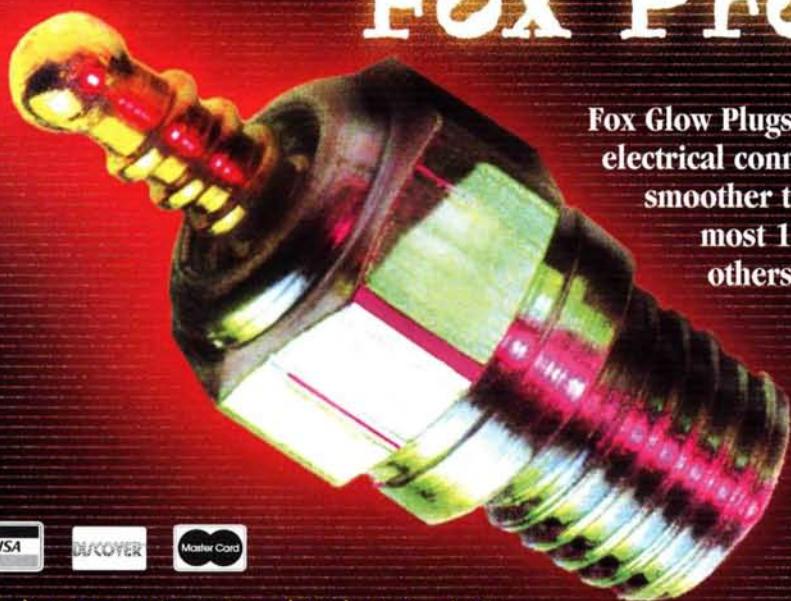
Jack Shaffer of Medford, OR, sent us this photo of his Sig Kadet Senior, which he proudly flies in his local Rogue Eagles Air Show. Jack attached a set of Great Planes floats so he could set it to water. He covered the plane in MonoKote then added that pristine John Deere finish. Jack powers his Kadet with a Super Tigre 51 engine, and he controls it with an Airtronics radio. ✈



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HOLIDAY WISH LIST

SCALE

HOLIDAY CLASSIC

If you're an RC plane enthusiast, you've probably spent many holiday seasons wishing for a shiny new warbird. This year, why not ask for the best? The EZ Mustang from MRC/Altech is a .40- to .46-size aircraft with a brushed-aluminum finish and outstanding scale details such as rivets and weathering. Best of all, this classic fighter comes almost ready to fly. If you play your cards right, you could be wowing the crowd in Times Square by New Year's Eve. Price: \$340.

MRC/Altech, (732) 225-0091; www.modelrectifier.com.



REST YE MERRY GENTLEMEN

Why not ask for the almost-ready-to-fly Boeing P-26 Peashooter and let the folks at Giantscaleplanes.com do most of the work for you? The Peashooter's 71-inch-long wings are constructed of sheeted foam and covered with film, as are the stab and control surfaces, and the kit includes a fiberglass fuselage, cowl and a complete set of decals. All of its control surfaces have beveled leading edges, and the control-horn mounts come installed. The Peashooter runs on a .60 2-stroke or .91 to 1.20 4-stroke engine, and it sells for \$279.99.

Giantscaleplanes.com, (610) 282-4811; www.giantscaleplanes.com.



A WORD TO THE WISE (MEN)

You can keep the frankincense and myrrh, but we'll take the gold—especially if it's Top Flite's Golden Edition Sea Fury. This pretty warbird is loaded with scale touches such as ABS air scoops, wing blisters and landing-gear doors and is priced at just \$269.99. Its fully interlocking, lock-and-tab, I-beam wing construction makes it sturdy, while the gelcoated fiberglass cowl and separately available cockpit kit (\$21.99) really give it a finished look. The Sea Fury sports a 64-inch wingspan and weighs between 10 and 12 pounds ready to fly. Just add your favorite .91 to 1.20 4-stroke or .60 to .90 2-stroke to complete the package.

Top Flite; distributed by Great Planes Model Distributors, (800) 682-8948; www.greatplanes.com.



SUPER STOCKING STUFFER

The Ryan STA represents a significant piece of aviation history, and who wouldn't want that wrapped up with ribbons? The scale details on Great Planes' Ryan STA ARF pay tribute to the classic design that marked aviation's Golden Age. Powered by a 1.20 4-stroke engine, this model features cockpit detailing, cowl ducting and blister detail. The fiberglass wheel pants and cowl are painted in three colors to match the original Ryan's color scheme. It doesn't get any better than this. Price: \$349.99.

Great Planes Model Distributors, (800) 682-8948; www.greatplanes.com.



Every year, the staff here at *Model Airplane News* sits down together and goes through all the great products that we've seen throughout the year—all the kits, engines, tools and accessories that we've previewed and reviewed—to come up with our "Holiday Wish List." We talk it over and compile a list of our favorites—products that we think represent the best the RC airplane industry has to offer. The conversation can get pretty heated; after all, we have only limited space and a lot of great stuff to choose from. In the end, we came up with what you see here—the products we hope to find under our own Christmas trees! We threw in a bunch of new stuff, a few perennial favorites and a couple of outrageous "dream gifts." So take a look; you might want to add a few of these to your own list.

MEGATECH M-46

If you want to give a gift that's certain to be appreciated, get the M-46; it's in the most popular size category (.40 to .46), it's reliable and powerful, and it's very reasonably priced. What could be better? The M-46 features true ABC piston/sleeve technology; dual ball-bearing-supported crankshaft; twin-needle carburetor with mechanical idle stop that makes setup easy for owners of non-computer radios and an efficient

muffler. All M-Series aircraft engines are covered by a two-year warranty. Street price is \$69.95.

Megatech; distributed by America's Hobby Center, www.megatechrc.com.



ENGINES

THREE-CYLINDER 4-STROKE = UNLIMITED FUN

Need the perfect engine for that winter scale project? How about Saito's beautiful .90 3-cylinder radial? You can't beat the smooth torque and superb transitional response of a radial, and the sound of three cylinders firing in 4-stroke harmony is just the kind of Christmas carol to get you in the holiday spirit. As on all Saito products, the workmanship is outstanding, and with the gold-rocker-cover-over-black-cylinder look made popular in the Golden Knight series, the engine looks as great as it works. Price: \$699.

Saito; distributed by Horizon Hobby Inc., (217) 355-9511; www.horizonhobby.com.



HOLIDAY HORSEPOWER

Nothing brings out holiday cheer like big-time bhp! Just think: 3.7hp at 8,500rpm—that's enough to make Scrooge himself feel all warm and fuzzy! The O.S. 1.60 FX-FI fuel-injected engine includes the EC-2 engine-control unit that monitors inputs from rpm and combustion-temperature sensors, and it regulates fuel through a solenoid-operated valve. The result is an adjustment-free, optimum air/fuel ratio at all rpm—better power, consistency and efficiency with less maintenance. The price has come down, too, since we first scooped this engine; it's now just \$799.

O.S.; distributed by Great Planes Model Distributors Co., (800) 682-8948; www.greatplanes.com; www.osengines.com.



HOLD ON TO YOUR STOCKINGS!

The Pizazz 40 ARF has the performance to knock your socks—or stockings—right off. This 48-inch-span model was designed for full 3D aerobatics; it features one-piece construction for extra rigidity during those high-G maneuvers. The built-up balsa-and-ply construction is visible through the transparent covering, and the oversize control surfaces enhance response. The gear, wheels and all the necessary hardware are included in the \$159.95 price; just add your favorite .40 to .50 2-stroke or .40 to .72 4-stroke.

Horizon Hobby Inc., (800) 338-4639; www.horizonhobby.com.



SPORT

YOUR DAYS WILL BE MERRY AND BRIGHT ...

... just thinking about the fun you'll have on wind and water with the Thunder Tiger Seamaster .40 ARF. This 59.5-inch-wingspan flying boat is rugged enough for rough seas, thanks to its balsa-and-ply construction and blow-molded engine pod. The model is covered in Ultracote and includes the tank and spinner. The \$219.99 kit even includes landing gear and wheels to convert the plane to land use. You'll need a 4-channel radio and a .40 to .46 2-stroke or .54 to .60 4-stroke. We like the Thunder Tiger F-54S 4-stroke (\$180); it has plenty of torque to get the Seamaster up on plane for quick liftoff.

Thunder Tiger; distributed by Ace Hobby Distributors, (660) 584-7121; www.acehobby.com.



TOOLS & ACCESSORIES



OH, THE WEATHER OUTSIDE IS FRIGHTFUL ...



... but the flying is still delightful—if you have the *Cockpit Master* flight simulator from MachineWorks Northwest. There are several great flight sims on the market, but what we really like about *Cockpit Master* are the extras: extra planes, extra fields, extra features—all downloadable free from the *Cockpit Master* website! You can customize the models with dozens of adjustable settings, and thanks to the included patch cord and adapter set, *Cockpit Master* will work with pretty much any transmitter that has a buddy-box port. Multiplex offers a great package deal that bundles the *Cockpit Master* sim with its Pico 4-channel transmitter (\$149), or you can buy the program by itself (\$99) and use your favorite radio.

MachineWorks Northwest; distributed by Multiplex USA, (818) 838-6467; www.multiplexrc.com; www.cockpitmaster.com.

THE GIFT THAT KEEPS ON GIVING

As top-of-the-line radios go, it really doesn't get much better than the JR PCM 10X. With an extensive range of features too numerous to mention, this highly versatile transmitter is a marvel of computerized functionality. Though it's intended for the most demanding pilots, its sophistication and well-thought-out programming will also suit the needs of beginners. It even includes DataSafe: data-transfer functions make it easy to store model settings on a PC floppy disc as well as to download and email them. The PCM 10X may just be the very last transmitter you'll ever have to buy (or ask for). Price: \$1,250.

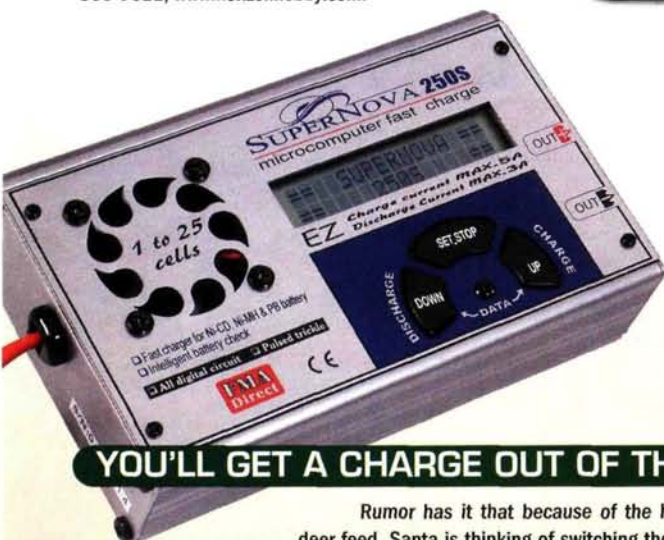
JR; distributed by Horizon Hobby Inc., (217) 355-9511; www.horizonhobby.com.



SLIMLINE AIRBASE

The Airbase has to be one of the most useful items available, both in the workshop and out at the field. It offers 360-degree, walk-around working freedom with convenient tool-tray access from all work positions; it's truly a superb work aid. The collapsible Airbase features a sturdy, 3/16-inch-thick, molded-plastic base with nonskid rubber feet; a 3-way adjustable powder-coated steel cradle; an all-aluminum folding stand and adjustable straps for plane transport. Its suggested retail price is \$139.99.

Slimline Mfg., (480) 967-5053; www.slimlineproducts.com.



YOU'LL GET A CHARGE OUT OF THIS

Rumor has it that because of the high price of reindeer feed, Santa is thinking of switching the sleigh to electric power this year. If he does, he'll want an FMA SuperNova 250S to keep his batteries topped up. This excellent charger made our list of favorites in the October issue, and no wonder: 1 to 25-cell, 50 to 3000mAh, Ni-Cd and NiMH capable; this little unit can do it all. Best of all, it's fully automatic, push-button operated and has multiple protective features, so it's pretty much impossible to screw up. Just connect it to your 12V power source, plug in your battery, and hit charge—that's it! With all these easy-to-use functions, the SuperNova is a bargain at just \$140.

FMA Direct, (800) 343-2934; www.fmadirect.com.

ALL I WANT FOR CHRISTMAS IS MY OWN PRIVATE JET

OK; that might be out of reach for most of us, but Bob Violett Models has the next best thing: the BobCat. This 66-inch-wingspan sport model is an honest-to-goodness turbine jet but in a package you can fly—even if you don't own your own corporation. The BobCat is practical, too; it can take off from shorter, rougher fields than most jets, and it can fly and land more slowly, so it makes a good turbine trainer.

Bob Violett Models, (407) 327-6333; www.bvmjets.com.



CRAZYPILOTS COCKPIT STUFFERS

For the RC pilot who has everything, here's an opportunity to really "get into" your model. Who wouldn't want a custom-made, scale, miniature pilot figure created in his own image? CrazyPilots first sculpts a bust from clay and then produces lightweight, molded-plastic-resin pilot figures that are incredibly realistic. Also available as full-body figures in various scale sizes, these pilot figures come painted and ready to install. To get your own cockpit occupant, simply send a front- and side-view snapshot to CrazyPilots; in several weeks, your handsome little "mini-me" will be delivered to your door. Prices vary by size, but a 1/4-scale bust costs \$110 for the first one and about \$40 for each subsequent "clone" produced after the first molding.

CrazyPilots; c/o Byron Jungjareon, phone/fax (650) 737-9355; CRAZYPILOTS@aol.com.

PRACTICAL GIFT BASKET

The words "gift basket" might make you cringe at the thought of another decorative but utterly useless collection of knick-knacks and bric-a-brac; just how many kinds of potpourri or exotic cheeses does one person need, anyway? But if the basket contains something useful—such as Zap glue—you'll be thanking the person who gave it to you all flying season.

Zap has an adhesive for every occasion; seven kinds of CA, from traditional to flexible to plastic- and paint-safe; two kinds of kicker; three formulas of epoxy and finishing resin and much more. When it comes to glue for the modeling hobby, nobody beats Zap.

Zap Glue; distributed by Pacer Technology, (800) 538-3091; www.pacertech.com.



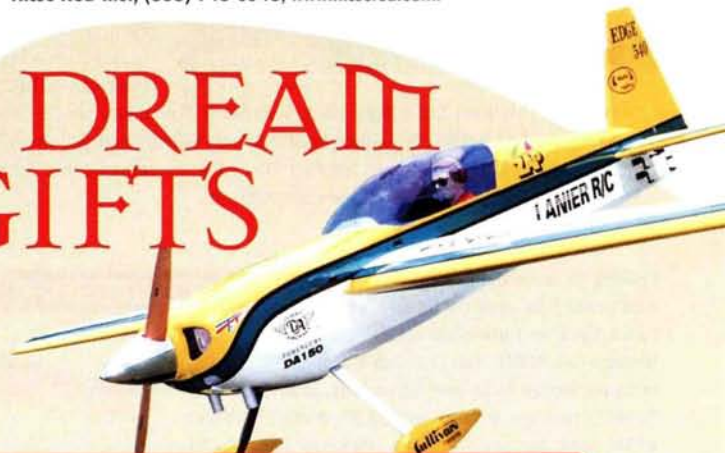
NEW TECHNOLOGY FOR THE NEW YEAR

Hitec Prism 7X, the Eclipse is compatible with the Spectra frequency synthesizer. This transmitter comes packed with all the features you expect of a high-end computer radio—endpoint adjustment, dual rates, exponential, subtrims, programmable and preprogrammed mixes—without the high price tag; it's just \$285!

Hitec RCD Inc.; (858) 748-6948; www.hitecrd.com.



DREAM GIFTS



WANT A PLANE THAT LOOP-DA-LOOPS?

We haven't forgotten about all you giant-scale enthusiasts out there, and neither—we hope—will Santa. The 102-inch wingspan on this 1/4-scale Extra 300S from Lanier RC makes this aerobat a giant-scale modeler's delight. This balsa, plastic, plywood and foam kit is both IMAA- and IMAC-legal, and its built-in assembly aids help create true-to-scale style. A competition plane certainly needs a competitive engine, and the DA-150 from Desert Aircraft was designed specifically with TOC- and Masters-style competition in mind. So if that 140-size engine doesn't produce as much power as you'd like, pick up the DA-150 and tell your competitors to look out!

Lanier RC; (770) 532-6401; llanierc@aol.com; www.lanierc.com.

Desert Aircraft; (520) 722-0607; desertaircraft@theriver.com; www.desertaircraft.com.



I HEAR FLORIDA IS NICE THIS TIME OF YEAR ...



... but not as nice as it will be in April, when Top Gun rolls around. For 2002, the ultimate scale competition is moving to a new venue: Linder Airport in Lakeland, FL, not far from Walt Disney World. What better reason could there be to take a dream vacation than to see the best builders and pilots in the world with the most realistic and exciting models in the world? The 2002 Top Gun will mark the first year in which helicopters will fly in competition. In 2001, they were spectacular in their static event, and we can't wait to see them take to the air this spring. Grab your sunscreen, and we'll see you there!

For more info on Top Gun, contact **Frank Tiano Enterprises**, www.franktiano.com; for travel information, call Cindy Burkey at (954) 587-8491.

CALIFORNIA DREAMIN'

There's nothing like a trip to sunny San Diego to bust you out of your winter doldrums, so how about putting a trip to the Mid Winter Electric Fly-In at the top of your wish list? Hosted by the Silent Electric Fliers of San Diego, this yearly event is an absolute must-see for any electric enthusiast. Bring the whole family, and be sure to allow time for a stop at nearby world-famous Sea World. The 5th Annual Fly-In will be held in February, just a few months away, so make your list, check it twice, and pack your bags!

Silent Electric Fliers of San Diego; www.sefsd.com.



ELECTRICS



READY ... SET ... GO!

With the micro-electric gear-flight pack from Airtronics, you could be in the air in a blink of Rudolph's nose; all you'll need is a plane. Park, slow and micro flyers are among the fastest growing segments of the model industry—a fact not lost on the folks at

Airtronics. This neat little flight pack includes a 5-channel, single-conversion receiver, two super microsensors and a mini ESC. Airtronics also offers radio systems with the VG400 transmitter and micro RC gear packaged together. How's that for convenience? Price: \$169.95.

Airtronics, (714) 978-1895; www.airtronics.net.

Looking to scale things—like the credit-card bills—down a bit this year? Look no further than the

SHOPPER'S DELIGHT

WattAge Cub 400EP. This little Cub has all of the classic appeal of its big brother in its own high-quality, almost-ready-to-fly (ARF) package. But at only \$89.99, it won't hurt your wallet come January. As always, your best bet is to let Santa get it for you because then you'll be able to treat yourself to the new AstroFlight Mighty Micro 010 Brushless motor to power your new Cub. The 010 is smaller and lighter than many of its competitors, and it comes with an APC 5.5x2.2 prop and a 15-gram, sensor-less, variable, brushless speed control. That's three presents for the price of one; how can you pass that up? Motor price: \$120 (approx.).

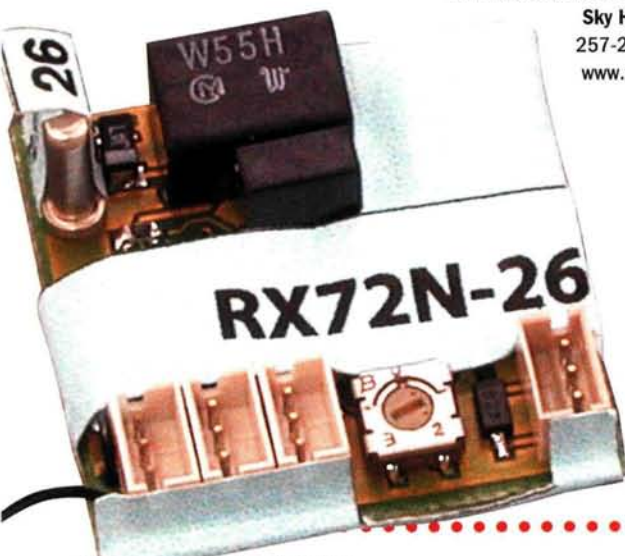
WattAge; distributed by Global Hobby Distributors, (714) 963-0133; www.globalhobby.com.

AstroFlight Inc., (310) 821-6242; www.astroflight.com.

GOOD THINGS COME IN SMALL PACKAGES

With the new Sky Hooks & Rigging RX72N-Hybrid receiver, you'll be flying that park flyer you found under the tree on Christmas morning by nightfall. That's because the RX72N is not just a receiver; it has a built-in speed control with BEC, soft start and selectable throttle cutoff points, too. This no-muss, no-fuss receiver doesn't even care which transmitter you use. It's designed to determine the brand by reading its signals. With this one, small, 5.5-gram unit, you'll be in the air in no time. Price: \$135.

Sky Hooks & Rigging, (905) 257-2101; info@microrc.com; www.microrc.com.



Want to re-create a WW II dogfight in your own backyard? You can start by asking the jolly fat guy to bring you this Me-109 Slowflyer ARF from Hobby Lobby. This semi-scale warbird can take off in just a few feet, climb fast and maneuver at such slow speeds that it can fly comfortably in confined spaces. With a 37-inch wingspan and 17 ounces of flying weight, the Me-109 will fly on a Speed 280 motor, but a 300 will significantly enhance performance. Who can pass that up? A painted foam structure and high-quality decals complete this realistic version of Germany's most famous fighter. Price: \$89.

Hobby Lobby Intl., (615) 373-1444; www.hobby-lobby.com.

YULETIDE TREASURE



A LITTLE HOLIDAY MAGIC

The Megatech Merlin slow flyer is sure to cast a spell over you, just as it did us. It is as ready to fly as any you'll find on the market: it takes less time to assemble than it takes the peak-detect charger to charge the battery (both included). The radio, motor and everything else you'll need are right there in the box, and the 49.5-inch-span model flies beautifully. The wings and tail are light, high-quality foam, and the rest of the structure is carbon fiber and durable plastic. The light wing loading (about 4.8 ounces per square inch) makes this among the most stable park flyers out there—perfect as a trainer, and you can't beat the price: just \$199.99.

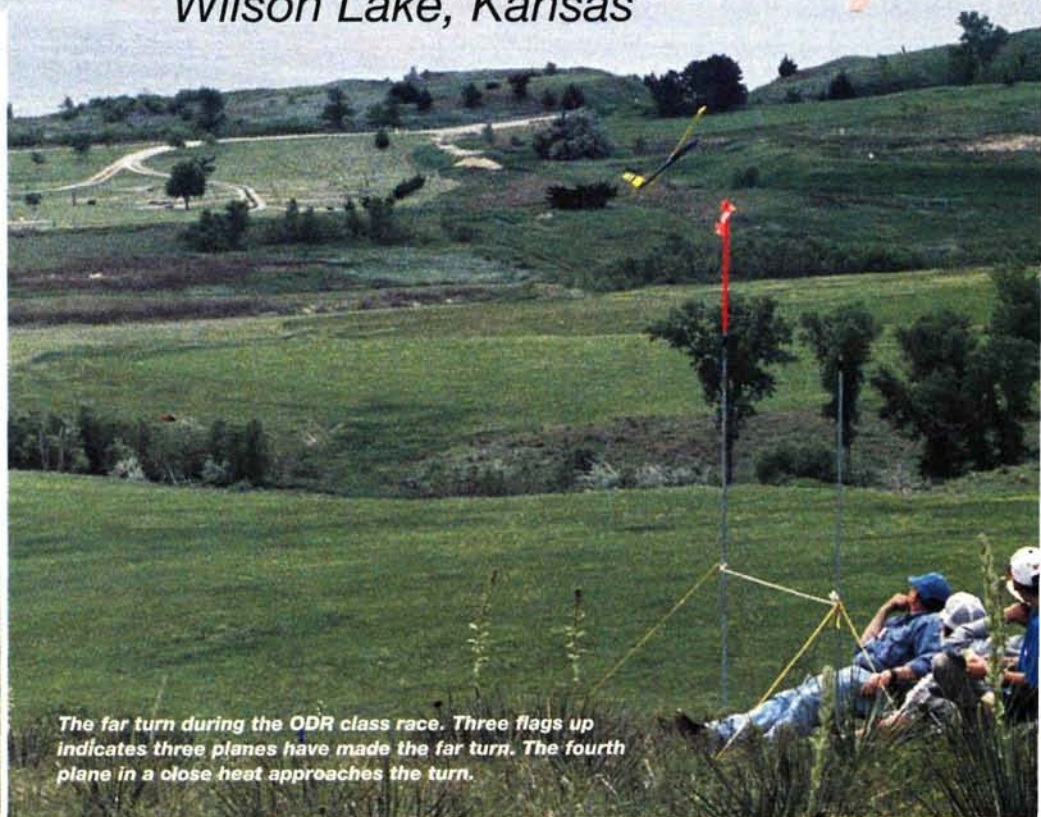
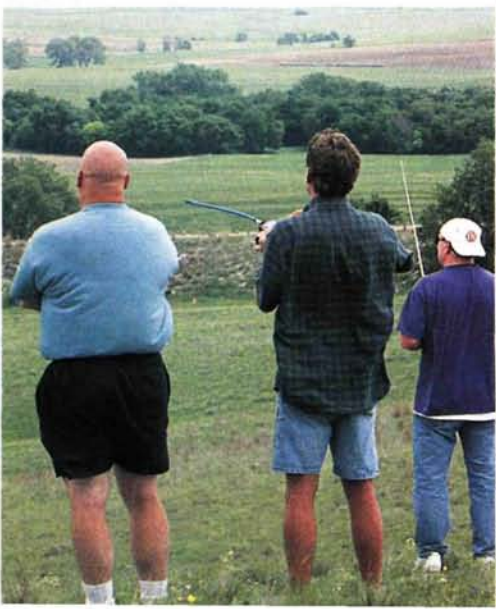
Megatech, (201) 662-2800; www.megatechrc.com.





Midwest Slope Challenge

*Hot pursuit over
Wilson Lake, Kansas*



The far turn during the ODR class race. Three flags up indicates three planes have made the far turn. The fourth plane in a close heat approaches the turn.



*New York Slope Dogs
Joe Chovan, Rich
Loud and Wayne
Rigby practice race
moves with Dave's
Aircraft Works'
Schweizer
1-26 EPP foam planes
at the Monooks Park
alternate flying site.*



Relaunch during the action of the Foamie Combat event. The plane is a Dave's Aircraft Works Foam-51 bounceable EPP foam combat plane.



by Dave Garwood

"Clean start!" shouted the near-turn judge as four slope-racing sailplanes entered the course at almost the same instant. "Man, this is a close one," muttered my caller as the four planes crowded the first turn. "Fly smooth. Don't waste energy." I flew as smoothly as I knew how, minimizing control-surface deflections—which add drag—and grabbing all the speed I could by flying in the high-lift band at the lip of the ridge despite the danger of ground obstacles, but I could not shake Pat McCleave. For four laps we were close, neither plane pulling ahead, but at least we avoided collisions in the turns. We came out of the last turn flying wingtip to wingtip, and I tried to summon all possible concentration and skill.



MIDWEST SLOPE CHALLENGE



Left: Joe Chovan launches a Dave's Aircraft Works FoaMe-109 bounceable EPP foam combat plane. Below: cross-cultural exchange: William Crane and Wes Parmenter of the Smithville Dam Busters RC 1/12-scale, fuel-powered scale combat club try their thumbs at full-contact foamie combat slope soaring.

"Dive! Dive!" shouted my caller on the final leg, urging me to give up altitude for airspeed and finish the race down the hill near the lake, if necessary; but Pat dived more steeply, poured on more speed and pulled ahead at the end.

"One, red plane; two, white plane," cried the turn judge, indicating the order of finish. "McCleave won by this much," he added, holding his palms 6 inches apart.

This was one of dozens of heats in the One Design Racer (ODR) class at the Midwest Slope Challenge. This class is designed to equalize the airframe advantage in an inexpensive "sportsman class" that has made entry into high-performance slope racing accessible to many pilots. This was a great example of the ODR class in action—close racing with sophisticated yet inexpensive sailplanes—and my hat is off to Pat McCleave for superior airmanship.

BACKGROUND

Not many clubs promote One Design Racing the way the Lincoln (NE) Area Soaring Society (LASS) does, and the eighth annual Midwest Slope Challenge was the place to see and do it. The Challenge was run on May 18 to 20, 2001, at Wilson Lake, KS, and hosted 56 pilots from Arizona, Colorado, Illinois, Iowa, Kansas, Missouri, Nebraska, New York, Oklahoma, South Dakota, Tennessee, Wisconsin and England.

Wait a minute. Did you say slope soaring in Kansas? Yeah; Kansas. This was my fourth trip to fly the slopes of the Wilson Lake reservoir; in my opinion, it's one of the top 10 slope sites in the country. Though some California, Michigan and Washington slope sites may be better



known, soaring has been going on in Kansas for an awfully long time.

On the return trip, I read an article in the May 2001 issue of *National Geographic* on flying dinosaurs. "Pterosaurs, Lords of the Ancient Skies," notes that, "While fossils are found on every continent, pterosaur remains are most common in sedimentary rocks formed at the bottom of relatively shallow, calm waters. Many North American pterosaur fossils come from deposits of a seaway that covered much of the continent some 85 million years ago."

A world map in the article named seven sites rich in pterosaur fossils, including Kansas. Walking the hills of the limestone Post Rock region of central and western Kansas, you trip over marine fossils. Because pterosaurs are believed to have been soaring animals with wingspans ranging from 18 inches to 36 feet, it's easy to imagine that

we are not the first by far to soar over Kansas. The U.S. Corps of Engineers' Wilson Lake reservoir spreads out along a 100-mile shoreline and is surrounded by soarable hills facing most wind directions. The lake is a center for boating, windsurfing, fishing, camping and hunting.

THE EVENTS

The Challenge was scheduled for Friday, Saturday and Sunday, mainly to allow extra days in case we had to wait for wind. Friday gave us north wind, and the Foamie Combat event was held at a new hill discovered by Challenge air boss Aden Shipp, who had arranged with the landowner for us to drive into his pasture and fly in an absolutely terrific bowl with a view.

We flew California-style Foamie Combat: 48-inch-span, bounceable EPP-foam planes with no hard materials near their noses or leading edges. Forty-nine pilots flew in each 5-minute, 16- or 17-plane heat, scoring a point for each collision that resulted in grounding an opponent's plane. To score, the attacker must execute a roll or a loop to demonstrate continued control. No confirming maneuver, no score. Each pilot is allowed a helper who can relaunch a downed plane as long as time remains.

With the great flying site and large number of entrants, there were plenty of whoops and hollers throughout the day. In the end, the greatest number of kills was achieved by first-place Duane Jenkins and William Crane, Paul Wilson, Jim Baker and Rob Hurd.

On Saturday morning, we experienced a light wind, which increased gradually throughout the day. The 29 registered pilots in ODR flew in a double elimination with four planes per heat. As the wind increased, we saw some excellent slope racing. The fastest and smoothest pilots were Jim Porter (first), Wayne Henning, Paul Wright and me.

The ODR class was developed by the Torrey Pines Gulls club to encourage design and construction of inexpensive, evenly matched racers, whether kitted by a manufacturer or built from scratch. Until this year, Charlie Richardson at CR High Performance Aircraft has had a lock on supplying kits for the class with his highly successful Fun-1, and we've been waiting for additional designers to develop ODR planes, perhaps making use of EPP foam or other materials. This year we got our wish, as two new ODR planes flew in the race: Rob Hurd's Algonquin ODR design is built from EPP foam and Coroplast stiffened in critical places by carbon-fiber ribbon; and Mike

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MIDWEST SLOPE CHALLENGE

Bailey's Mike's Models design starts with an EPP pod fuselage, adds a carbon-fiber tail boom and fits balsa and Coroplast tail parts. Both of these planes won heats, but neither finished in the trophy places. I'll be interested in seeing the results of another year's development of these new planes at next year's MWSC.

We fretted about having sufficient wind to race the big guns in Unlimited, but nearby thunderstorm activity stirred the atmosphere and presented us with excellent wind for the prime event. Twenty-four pilots flew in the five-lap, double-elimination race with two planes in each heat, and the flying generated maximum excitement for both spectators and waiting pilots. Jim Porter took first place, and the next three places went to Pat McCleave, Paul Wright and Wayne Henning.

On Sunday, pilots met on the main hill and found a west wind, so the Foamie Combat Race, a provisional event in which pilots can race Foamie Combat and Foamie Warbird planes together, was cancelled. I'm looking forward to seeing this exciting event next year; it's a bonus for those who travel far to attend the MWSC.

CROSS-CULTURAL EXCHANGE

This year's MWSC saw cross-pollination between slope combat flyers and fuel-powered combat flyers. Smithville (MO) Dam Busters club members William Crane, Wes Parmenter and Tom Wild, experienced 1/2-scale powered combat fliers, came to learn about slope foamie combat and joined in with unparalleled enthusiasm. These guys flew in the combat event and put in plenty of time on the volunteer flag crew during the races. I asked William Crane about his impressions of slope foamie combat compared with 1/2-scale powered combat, and he replied:

"Both RC [powered] combat and slope combat are a blast! I wish my powered combat planes could bounce. It's great that you can pick up the foamie slope combat plane and throw it back into the air. The camaraderie in both events is great; pilots in either one would bust their butts to get you back in the air."

CONTACT INFORMATION

For more detailed information on the Midwest Challenge, the class rules and the schedule of next year's event, see the LASS website at www.alltel.net/~mwsc, or contact contest director Loren Blinde by email at MWSC@alltel.net, or at 6300 Strauss Ct., Lincoln, NE 68507; (402) 467-4765. ✦

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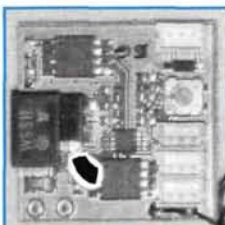
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competition aerobat*

HANGAR 9

Extra 330L ARF

by Jim Onorato

When Walter Extra first introduced his full-scale Extra, chances are he had no idea that it would be among the most widely modeled aircraft in recent times.

The full-scale Extra debuted in 1987, but since then, it has gone through a number of changes to improve its aerobatic performance. The latest modifications include a larger rudder and elevators with added counterbalanced areas for improved control authority in yaw and pitch. These improvements resulted in the newest generation of Extra: the 330L.

Designed by world-class pilot Mike McConville, Hangar 9's 1/3-scale Extra

330L is a fantastic-looking plane. It duplicates the full-scale tail modifications that give the model the same increased control authority.

WHAT'S IN THE BOX?

I was very impressed when I opened the boxes and saw what was inside. The Extra comes completely built up and beautifully covered with pearl blue, red and white Goldberg Ultracote. Its craftsmanship is topnotch, and the overall

appearance of the plane is outstanding.

The wings are built up and fully sheeted; the hinge pockets and servo pockets are already cut out. All of the control surfaces are dual-beveled at the hinge line, which allows for more than 45 degrees of throw for radical freestyle maneuvers.

The canopy and forward section form a one-piece hatch that permits easy access to the interior of the fuselage. The cowl, wheel pants and rugged, T-6 aluminum landing gear come already painted, and



SPECIFICATIONS

Name: Extra 330L

Manufacturer: Hangar 9

Distributor: Horizon Hobby Inc.

Model: giant-scale aerobat

Wingspan: 97 in.

Wing area: 1,750 sq. in.

Weight: 25 lb., 4 oz.

Wing loading: 33.6 oz./sq. ft.

Length: 88 in.

Radio req'd: 7-channel computer radio

Radio used: JR 10X PCM w/7 servos

Engine req'd: 60 to 80cc

Engine used: Zenoah GT-80 twin

Prop: carbon-fiber 24x10

Street price: \$899.99

Features: lite-ply and balsa construction; covered with Goldberg Ultracote; prepainted fiberglass cowl and wheel pants; built-up, fully sheeted wing; lug-in wing and stab; preformed and painted aluminum landing gear; instructions include 3D flying tips from seven-time TOC competitor Mike McConville.

Comments: the Hangar 9 1/8-scale Extra 330L ARF is a model with high-quality design, construction and performance. It can be assembled fairly easily, and its aerobatic ability is nearly unlimited. The Extra 330L is everything you would expect of a true competition aerobat.

Hits

- Excellent flight performance.
- Easy-to-follow plans and instructions.
- Expertly covered with Goldberg Ultracote.
- Great-looking overall appearance.

Misses

- Hinge-sealing material not provided.



PHOTOS BY WALTER SIDAS



FLIGHT PERFORMANCE

The first test flight took place on a beautiful sunny day with almost no wind. With my engine at full throttle, I checked my radio for range; then I topped off the tank and fired up the Zenoah GT-80 for the initial flight. I set my transmitter's mid- and high rates to give the recommended amount of throw for standard flying. I set the low rate at 75 percent.

• TAKEOFF AND LANDING

The Extra felt firm on the ground and taxied nicely with no tendency to nose over. On takeoff, the tail lifted almost immediately, and the Extra tracked straight ahead without any right rudder. I let it roll about 100 feet, and then I applied just a touch of up-elevator. The Extra lifted smoothly into the air with the wings perfectly level. The power of the GT-80 was immediately apparent!

The Extra landed best with a little power. I kept the throttle slightly above idle as the plane made its final approach and adjusted it as necessary to maintain altitude and flying speed. I cut to idle just as I faired the Extra for a beautiful 3-point landing. Rollout was smooth with just a bit of up-elevator to keep the tail firmly on the ground.

I did not have to make any trim adjustment on my first flight.

• LOW-SPEED PERFORMANCE

At slow speeds, the Extra is smooth and predictable. I took it to a safe altitude and reduced the throttle while applying more and

more up-elevator. The plane practically stopped in midair before it stalled straight ahead. The plane can fly at very slow speeds without losing stability, and it can execute all but vertical maneuvers at part throttle.

• HIGH-SPEED PERFORMANCE

The Extra goes anywhere you point it at high speeds. It tracks extremely well and is a smooth and stable flyer; however, I did encounter some rollout at the top of full-throttle loops with full-

elevator deflection. I remedied the situation by reducing the amount of elevator throw and eased back on the throttle as the plane came over the top of a loop.

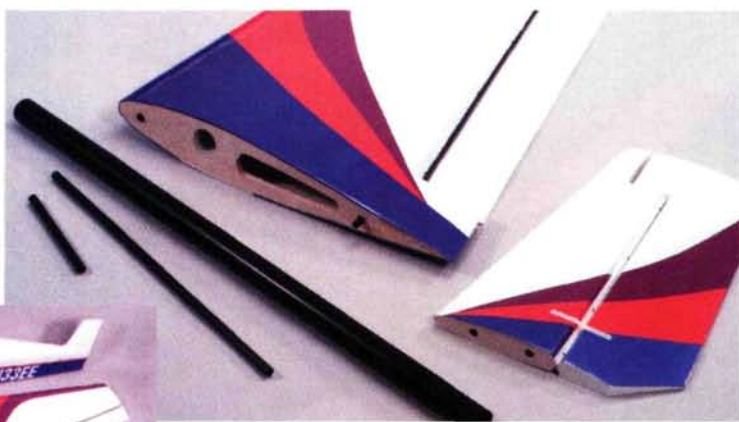
• AEROBATICS

The Extra is a proven aerobatic airplane that's capable of every imaginable maneuver. Inside and outside snap rolls were incredibly fast, and it didn't matter whether the plane was heading up, down, or level. Axial rolls were fast and truly axial. Sustained knife-edge and outside 360-degree turns were also no problem for the Extra. Spin recovery was within $\frac{1}{4}$ spin when the controls were released. When I rolled the Extra to inverted flight, it flew just as straight as an arrow with no controls. Lomcevaks and other tumbling maneuvers were second nature to the Extra.

The Zenoah GT-80 twin is an awesome engine; it gave the Extra unlimited vertical performance. Hangar 9 says that a G-62 is adequate for good sport power, but I'm glad I used the GT-80.

all of the painted parts perfectly match the Ultracote covering.

The fuselage is made of lite-ply and is extremely lightweight. The kit does not contain any of the necessary hardware, but a Hangar 9 hardware package



The 1½-inch-diameter aluminum wing tube firmly attaches the wing to the fuselage. Be sure to seal the elevator and rudder hinge lines to avoid control-surface flutter.



The Extra 330L comes with everything you see here right out of the box. A Hangar 9 hardware package that includes everything else you need is available separately for \$149.95.

40-page instruction book is full of photos and is very well written. It lists the equipment, parts, tools and adhesives needed for each step. It even includes some great setup and flying tips from Mike McConville.

ASSEMBLY

Before I started the assembly, I shrank out the wrinkles in the covering. Since there is very little overlap between the various colors of covering, I first sealed the edges with a heating iron; then I used a heat gun. If you don't do this first, bare wood may later be exposed where the colors overlap.

Begin the assembly with the installation of the aileron servos and control horns, then hinge and seal the control surfaces and install the aileron linkages. Hangar 9 recommends that you use servos with a minimum torque of 80 oz.-in. on all of the control surfaces. For the ailerons, I used JR 8411 servos, which have a torque of 155 oz.-in. Be sure to center the aileron servos in

is available separately; it includes just about everything you'll need to complete the Extra except a radio and an engine. All of the parts meet the high standards required for a plane of this size.

You can usually judge the quality of a kit by the quality of the instruction booklet, and that is certainly true in this case. The

the cutouts; they are a little long, and you want to ensure that the mounting screws go into the wood mount.

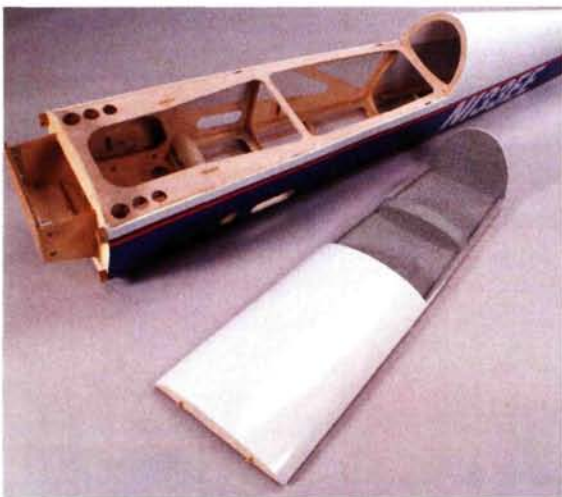
I replaced the stock servo arms with the 1-inch, heavy-duty metal arms included in the optional hardware package. I also used the recommended Rocket City control horns, ball links and titanium Pro-links for the linkages and Robart Super Hinge points for the hinges. The Pro-links feature right-hand threads on one end and left-hand threads on the other, and this permits easy, accurate adjustments without disconnecting the linkages.

The instructions say you must seal the aileron and elevator hinge lines because failure to do so may cause control-surface flutter, which would result in a crash. I was surprised that the kit did not include the material necessary to seal the hinge lines. If you want to match the colors on the control surfaces, you'll need to buy two rolls of Ultracote to get the four strips required; you could also simply seal the hinge lines with clear plastic tape.

After I had replaced the stock servo arms with metal ones, I installed JR 8101 servos (two each) for the rudder and elevator. I used a Y-harness on the rudder servos and a reversing Y-harness on the elevator servos. I then added the elevator control horns and hinges.

The Extra has a removable two-piece stab/elevator that plugs into two aluminum tail tubes. Attach the stab to the longer of the two tail tubes with 4-40x $\frac{3}{8}$ -inch socket-head screws; thread the screws through a hole in each stab half and then into the tube. Hangar 9 uses a shorter tube to prevent the stab from rotating.

I was sent one of the earliest production



Above: the fuselage is constructed entirely of lite-ply and is extremely lightweight. The one-piece hatch that's formed by the canopy and forward section provides easy access to the interior of the fuselage.

ZENOAH'S GIANT TWIN—THE GT-80

Based on the original GT-74 (Z-445) twin-cylinder design, the new Zenoah GT-80 is a logical choice for the $\frac{1}{8}$ -scale Extra 330L from Hangar 9. The GT-80 features an increased displacement (increased bore diameter) that boosts horsepower to 5.8. Each piston has dual rings that provide improved cylinder sealing, and the quartz ignition system makes starting a breeze (there are no ignition batteries to charge). The rear-mounted spring starter is a real plus; to start the engine, just wind the prop clockwise one turn and let go. The simultaneously firing twin cylinders give the GT-80 a smooth transition from idle to full power.

BIG PROPS

Used for giant-scale aerobatics and Scale Masters scale competition, the GT-80 can turn very large props to provide gobs of thrust. The engine can easily turn a custom-made, scale, 3-blade, 24x10 prop (such as was used on Greg Hahn's 1999 Scale Masters-winning SBD Dauntless), and for 3D aerobatic use (e.g., hovers and torque rolls), the GT-80 has no problem turning a Bolly 24x10 prop at 7,700rpm.



SPECIFICATIONS

Bore: 1.56 in.

Stroke: 1.20 in.

Displacement: 80cc (4.87 in.)

Weight w/o muffler: 108 oz.

Weight w/muffler: 123 oz.

Cylinder lining: chrome-plated

Recommended props: 22x8/10, 24x8/10

Rpm range: 1,800 to 10,000

Hp: 5.8

Fuel: Regular unleaded gasoline with 32:1 oil mixture

Price: \$999

kits, and the internal stops in the stab halves that would have prevented the short tube from sliding all the way in were inadvertently left out of it and the other early models. I understand that Hangar 9 has since remedied the situation, but if you have an early production model, you can simply glue the short tube securely to the fuselage. After I installed the stab, I added the control horns to the rudder, hinged it and installed the Pro-links. I then added the tailwheel.

Next I assembled the landing gear, wheels and wheel pants and bolted them to the fuselage. There are aluminum angles located inside the fuselage that tie the gear to the internal formers for a strong installation.

I then installed the receiver, battery and fuel tank, followed by the engine and cowl. I used a Zenoah GT-80 twin gasoline engine; it's the perfect match for this big Extra. The firewall has built-in right thrust, is reinforced with aluminum angles and comes with the holes already drilled for the GT-80. (An adapter is included for the G-62.)

I cut out the cowl to accommodate the engine and mounted it on the fuselage with four 4-40 socket-head bolts. The GT-80's twin cylinders fit nicely inside the cowl, and the stock mufflers only required two small holes; however, I did cut a 5x5-inch air outlet in the bottom

of the cowl to ensure proper cooling.

I installed a $\frac{1}{8}$ -scale Hangar 9 civilian pilot figure and two Hangar 9 scale instrument panels in the hatch assembly and attached the canopy with Pacer formula 560 glue. Hangar 9 provides an ample supply of decals that give the Extra a finished look. For a final touch, I added a 24x10 prop and a 4-inch Tru-Turn aluminum spinner.

CONCLUSION

Hangar 9's $\frac{1}{8}$ -scale Extra 330L is a full-blown, no-compromises plane that is capable of winning Unlimited class and freestyle IMAC competitions at the highest level. But it's also a great 3D, fun/sport airplane for Sunday fliers who want to go big. This ARF is about as good as it gets! ✦

Carl Goldberg Models, 4734 W. Chicago Ave., Chicago, IL 60651; (773) 626-9550; fax (773) 626-9566; www.goldbergmodels.com.

Hangar 9; distributed by Horizon Hobby Inc., 4105 Fieldstone Rd., Champaign, IL 61822; (217) 355-9511; www.horizonhobby.com.

JR; distributed by Horizon Hobby Inc. **Pacer Technology**, 9420 Santa Anita Ave., Rancho Cucamonga, CA 91730; (909) 987-0550; (800) 538-3091.

Robart Mfg., P.O. Box 1247, 625 N. 12th St., St. Charles, IL 60174; (630) 584-7616; fax (630) 584-3712; www.robart.com.

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Tru-Turn; distributed by Romco Mfg., P.O. Box 836, South Houston, TX 77587; (713) 943-1867; fax (713) 943-7630; www.tru-turn.com.

Ultracote; distributed by Carl Goldberg Models. **Zenoah**; distributed by Horizon Hobby, 4105 Fieldstone Rd., Champaign, IL 61822; (217) 355-9511; www.horizonhobby.com.

MRC/ALTECH

EZ TEXAN

Classic warbird ARF

by Craig Trachten

The EZ Texan distributed by MRC/Altech is everything you would expect of an EZ model. It is absolutely gorgeous. The more you inspect the components of this kit, the more you appreciate it. The EZ Texan is constructed entirely of plastic, foam and Mylar over lite-ply. It comes 90-percent factory-assembled and with almost everything you need to get

it into the air except an engine and radio gear. It has the same high-quality construction and attention to scale details as have come to define the EZ line as among the best almost-ready-to-fly (ARF) models available (including a brushed aluminum finish and visible rivets and weathering). The EZ Texan even comes with silver stickers to simulate the canopy frame.

CONSTRUCTION

• **Wing.** Like many ARFs, construction begins with the wing. The Texan's wing consists of three sections: a right wing, a left wing and a center section. The right and left wings are finished in a highly detailed, laminated form; the center section is in a skeletal state. The open center allows easy access when it comes time to install your servos, retracts and wing joiners.

When the wing joiners are in place, epoxy the right and left wings to the center section, then attach the bottom plate. Once you have installed the retracts and servos, attach the top plate. Because the top plate rests between the wing and the fuselage, there is no way it can fall off, so I chose not to glue it on. I used the leftover silver



The Texan comes with everything you see here. The quality of this kit is everything you would expect from the EZ line of aircraft.

canopy sticker material to cover and seal the leading (LE) and trailing edges (TE) of the two plates. To seal the side edges (front to back), I used yellow, self-stick trim material. This assembly procedure makes it easier

to access the retracts and servos if a problem arises later.

Attach the aileron linkage as shown in the instructions. All of the necessary hardware is included in the kit. I added a small piece of fuel tubing over each clevis, however, to ensure that they would not open.

Assemble the wing-mounting plate and front dowel reinforcement plate as shown in the manual, then test-fit the wing-mounting bolts in the mounting plate. Screw them down until you can barely see them over the side of the fuselage. The instructions say to cover the heads of the screws with paint or ink to mark the wing for the mounting holes, but I like to use liquid paper. It's easier to clean off if you have to re-mark the holes for any reason.





SPECIFICATIONS

Model: EZ Texan .30
Manufacturer: MRC/Altech
Distributor: MRC/Altech
Type: scale warbird
Length: 42.12 in.
Weight: 5 lb., 5 oz.
Wingspan: 57.29 in.
Wing area: 572 sq. in.
Wing loading: 21.46 oz./sq. ft.

Engine req'd: .30- to .40 2-stroke or .48 to .50 4-stroke

Engine used: Enya .53 4-stroke

Prop: APC 11x6

Radio req'd: 5-channel

Radio used: Futaba 8UAFS w/six Futaba servos (two ailerons, elevator, rudder, throttle and retracts)

Price: \$279.99; \$309.99 w/retracts

Features: highly detailed finish; 3-piece cowl w/radial engine detail; retractable landing gear; complete hardware package and pilot included.

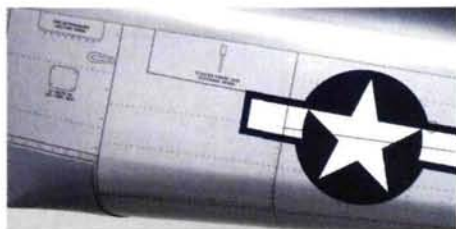
Comments: this kit was everything I expected from an EZ model. All of the parts go together easily, and the finished model produces excellent flight. The EZ Texan is another good example of the great scale appearance that's so much a part of all EZ aircraft.

Hits

- Good parts fit.
- Excellent scale details and finish.

Misses

- None.

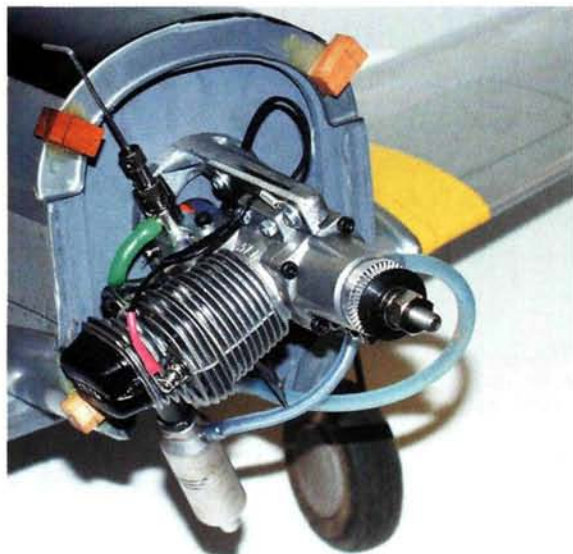


All of the graphics and scale details, including rivets, panel lines and vinyl stickers for the canopy frame, are top quality.

• **Fuel tank.** I assembled the fuel tank next. As with most kits, the manual shows a 2-line fuel tank, but I prefer 3-line tanks, especially when the aircraft has a cowl. I also like to put a clunk on the third line. This makes it as easy to get the fuel out of the aircraft as it is to put it in. It also eliminates the need for a fuel-filling valve, which could cause trouble in the future.

• **Engine.** Mount the engine of your choice on the supplied mount. The manufacturer suggests that you use a .30 to .40 2-stroke or .48 to .50 4-stroke engine. I installed an Enya .53 4-stroke engine. Screw the mounting plates to the mount frame, then attach your engine to the plates. I found that it's best to put a piece of masking tape on each plate before you mark the drill holes. It's easier to see a mark on the tape than on the metal.

Make sure the thrust washer is at least 10 centimeters from the firewall. I set mine at 15cm, which is the maximum recommended distance. I hate it when my spinner scrapes the cowl. I also installed a Du-Bro remote glow unit in the side of the fuse.



Because the Enya .53 engine has a front glow plug, a glow driver cannot be used directly; however, the Du-Bro remote glow socket gives the engine assembly a clean, finished look and adds an extra level of safety.

FLIGHT PERFORMANCE



It was slightly windy the first time I took the Texan out for a flight, so I had some reservations about attempting to fly the somewhat small plane. All my worrying was for nothing, though; the Texan handled the wind with ease. After a thorough preflight check and some minor engine adjustments, I was ready to get into the air.

• TAKEOFF AND LANDING

Because the gear legs are raked forward to prevent it from nosing over, the Texan taxied better than I had expected, given the small size of the wheels. I opened the Enya's throttle slowly opened, and the Texan was quickly airborne at about $\frac{3}{4}$ throttle. After a few trim passes, the Texan easily achieved straight and level flight. Landing proved to be very easy; the plane is very solid on approach and remains solid all the way through.

• LOW-SPEED PERFORMANCE

Because the Texan is somewhat light, it slowed down quickly when I reduced the throttle. Once it had slowed down, I was surprised to find it had no nasty snapping habits, as some warbirds have been known to have. Stalls are very straightforward; after the nose drops, simply apply power, and the Texan will be flying again.

• HIGH-SPEED PERFORMANCE AND AEROBATICS

The Texan tracks well at high speeds and needed no trim changes. With the throws set to the recommended rates, aerobatics were smooth and graceful. Loops showed no tendency to snap out on the top, and rolls were very scale-like. Point rolls and knife-edge flight were also possible, but inverted flight needed a small amount of down-elevator to achieve a level pass. All in all, the EZ Texan is relaxing and fun to fly!

Because the Enya .53 4-stroke has a front glow plug, a glow driver can't be used directly on the plug. Du-Bro's remote glow socket gives the installation a clean, finished look.

• **Tail.** Begin construction of the tail feathers by slotting the rear of the fuselage to accept the hinge part of the tailwheel bracket. I coat the wire where it passes through the hinge with a light oil; this prevents epoxy from sticking to it.

Mount the tailwheel as pictured in the manual, then epoxy the stab mount to the fuselage and the elevator center blocks to the elevators. CA the center block covers over the blocks. When all is dry, epoxy the horizontal stab to

the fuselage making sure that it is perpendicular to the fuselage and parallel to the ground. Epoxy the vertical stab to the horizontal stab, and be sure that it is perpendicular to and even with the rear of the horizontal stab. Secure the entire assembly with a thick coat of epoxy. It will all later be covered, so do not worry about the appearance. At this point, strength is more important than neatness. Oil the hinges in the rudder and epoxy the rudder to the horizontal stab.

Following the manual, assemble and install the included pushrods, then install the control horns and attach the rods.

• **Cowl.** The cowl is crucial to the final appearance of any airplane, so it is important that you do a good job assembling it. I did not assemble the cowl as it is described in the manual. If you use the thin CA recommended, you run the risk that it will leak



Because the Texan had so much room in its radio box, the receiver, servos and pushrods were all easy to install.

to the outside. I taped the ring halves together with masking tape, then I ran a bead of thick CA along the inside seams. Do not worry about strength at this point; this is only to prevent the pieces from shifting until the inside has been glassed. I attached the face ring of the cowl in the same way. Glassing the inside of the cowl ties the three pieces together and gives it body. Measure and then epoxy the cowl-mounting blocks to the firewall.

• **Cockpit and canopy.** I painted the cockpit and pilots with Testors military acrylic

flats. Because the painted parts were underneath the canopy, it did not concern me that the paint wasn't fuel-proof. Instrument-panel stickers are included in the kit, and they give the cockpit interior a nice, finished look. Next, glue the canopy to the fuselage. I use J&Z's RC-56 canopy glue, but Pacer also makes a good canopy glue. Both are water soluble, so a damp rag will get rid of any drips. The kit also includes silver stickers that simulate the frame of the canopy. These give the canopy a nice, finished look, and the lower sticker hides the joint line between the fuse and canopy.

• **Final adjustments.** Finally, check the center of gravity (CG), and make adjustments as necessary. The manual says that the aileron throw should be set at 8mm; I set the high rate at 10mm and the low rate at 6mm. I set the elevator throw to 16mm for the high rate and 10mm for the low; the manual recommends 15mm. I set the rud-

der throw at 45mm per the manual. I programmed some exponential into the ailerons and elevator. Make adjustments to your liking.

The EZ Texan was a pleasure to build. The quality of the parts and the outstanding scale details make the Texan a must-have in the hangar of any model airplane enthusiast. ✦

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NORTHEAST SAILPLANE PRODUCTS

Lil Luscomb

by Vic Bunze

You have to admire a model design that does so many things as well as the Northeast Sailplane Lil Luscomb. It is attractive to look at, simple to build and a pleasure to fly. It is a relaxing, 41-inch-span slow flyer that can cruise around your local ball field or climb up and sniff out thermals. Its light wing loading produces excellent handling; it's capable of mild aerobatics and is stable enough for light winds—up to 10mph or so. With an AstroFlight 010 brushless motor in place of the included Speed 280, the potential of the design comes out and it is transformed into a real hot-rod! All the gentle handling is still there if you want it, but the added efficiency and thrust of the Astro motor dramatically increases both performance and run time. It transforms a good airplane into a truly exceptional one.

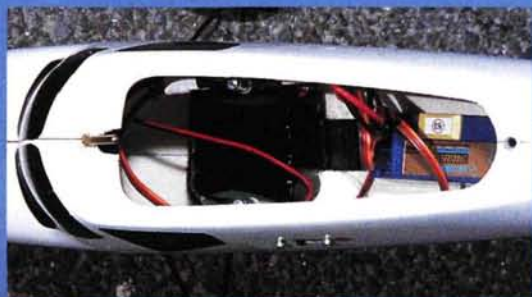
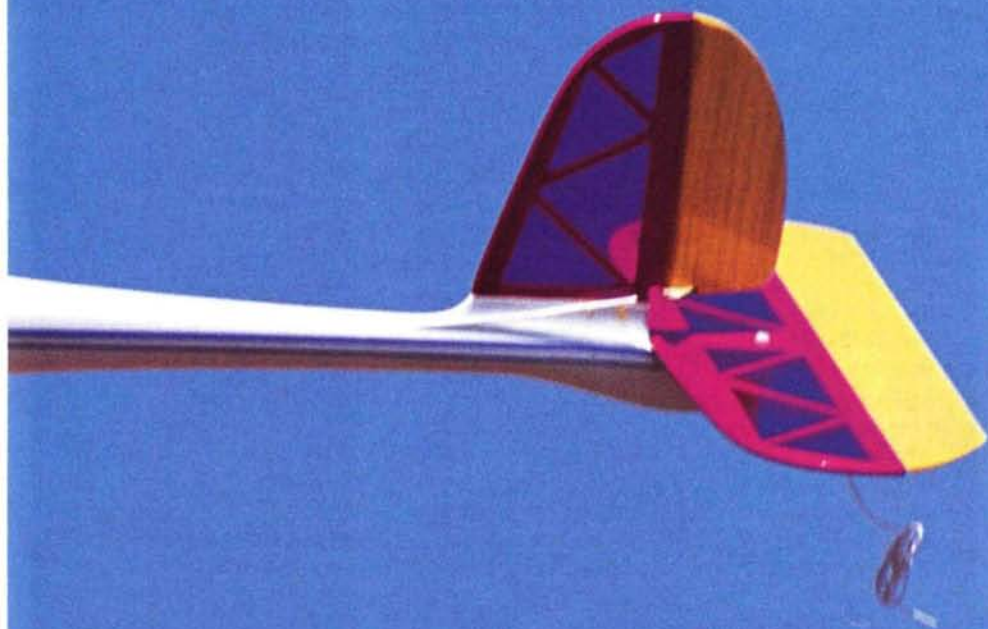
THE KIT

The Lil Luscomb was designed to be light, portable and simple to build. The fuselage is fiberglass, and the wing and tail surfaces are built up and expertly covered with transparent film. The Speed 280 motor and 4:1 gear drive are included, as are a prop, landing gear and wheels. The wing and horizontal stabilizer bolt on, and a special fitting allows the fin to be removable if you want. The gear is also easy to remove, and when it's disassembled, the Lil Luscomb fits into its original 40x7x8-inch box for easy transportation.





The Luscomb's fuselage is fiberglass, and the wing is built up and nicely covered. The kit is very comprehensive; it contains everything you see here, including the motor and prop.



Above: double-sided servo tape holds the two JR microservos in place while hook-and-loop strips on the battery and receiver make CG adjustment easy.

Right: the stock Speed 280 motor and prop were adequate, but with the Astro brushless motor and APC prop, the Luscomb is a real hot-rod.



PHOTOS BY WALTER SIDAS

SPECIFICATIONS

Model: Lil Luscomb

Type: semi-aerobatic park flyer

Distributor: Northeast Sailplane Products

Wingspan: 41 in.

Wing area: 287 sq. in.

Weight: 17 oz. (with 8-cell, 600mAh NiMH); 18 oz. (with 10-cell, 600mAh NiMH)

Wing loading: 9 oz./sq. ft. (9.6 oz./sq. ft. with 10 cells)

Motor: Speed 280 geared 4:1 (included)

Motors used: Speed 280 and AstroFlight 010 brushless geared 3.3:1 with AstroFlight speed control

Batteries: 8- and 10-cell, 600mAh NiMH

Prop: included prop on S280 motor, APC slow flyer 9x3.8 on AstroFlight 010 motor

Radio used: JR 10X transmitter with 7-channel Airtronics 92777 receiver and two JR NES 241 microservos

Price: \$99.95

Features: includes a geared S280 motor with propeller, all control linkages and control horns, preformed landing gear and light, 1.75-inch wheels. The fuselage is lightweight fiberglass with a white gelcoat finish. The wings and the vertical and horizontal stabilizers are covered with a transparent heat-shrink film with contrasting rudder and elevator colors (many color combinations are available).

Comments: this model is a joy to fly, and it can be flown in a Little League ball field under a variety of conditions; no need to be grounded in a modest breeze. It has low wing loading and can be cruised around or flown aggressively to perform rudder and elevator aerobatics. This plane is an excellent thermal machine, and very long flights are routine. The highly visible shape and color look great on the ground and in the sky.

Hits

- Versatile flight performance.
- Very fast and easy to assemble.
- Excellent appearance and workmanship.
- Convenient wing-attachment method.
- Compact and easy to transport.

Miss

- The propeller provided is too large for ground takeoffs (fixed on later kits).

ASSEMBLY

With the fuselage and wing completed and the tail feathers covered and hinged, there is little construction to be done, and that makes this model quick and easy to complete. I chose to glue the vertical stabilizer into its faired slot on the top rear of the fuselage. I mounted the wing using an 1/8-inch-diameter brass key at the leading edge and a single hold-down bolt at the trailing edge. The bolt is connected to a nut that's cemented to a hold-down plate on the fuselage under the wing's trailing edge. This makes the wing easy to remove for battery access and gives a clean, pleasing appearance. The landing-gear wire has an innovative mounting: the wire follows the fuselage's inside contour at the wing leading edge, loops over the brass wing key and goes back down to exit at each side of the fuselage bottom. It is easy to install, and once in place, it is sturdy and functional.

The provided Speed 280 geared motor is mounted on the fuselage nose ring with two bolts and is simple to install and remove. This last feature proved useful; I did remove it later to replace it with a brushless AstroFlight 010 motor.

The 1/16-inch plywood control horns are inserted into slots in the rudder and the elevator. Z-bends are used at the rudder and elevator, and I used a small servo quick link at the servo end to finely adjust the length of the control wires. It is important to remember to insert the pushrod Z-bends into the horns before you cement them to the control surfaces. The wires are guided through thin plastic tubing that is routed through exit slots just in front of the elevator and the rudder. I cleaned the inside of the fuselage with acetone and then used regular, double-sided servo-mounting tape to attach the servos to the fuselage sides. I attached the battery pack and receiver to the fuselage floor using a pair of hook-and-loop strips so I'd be able to shift them fore and aft to obtain the desired balance. For the initial flights, I started at 25 percent back from the leading edge.

I was really pleased with how soon this plane was ready for flight and with its elegant appearance. The old adage says, "If it looks good, it'll fly good," and I was eager to find out.

CONCLUSION

The Lil Luscomb is versatile; it can give enjoyment as a thermal-seeker, a relaxing cruiser, or as a low-to-the-ground, rudder-and-elevator aerobatic machine that does



FLIGHT PERFORMANCE

• TAKEOFF AND LANDING

I made my initial flights with the Speed 280 geared motor, the supplied prop and a 6-cell, 600mAh Ni-Cd pack. The prop was too large to take off from the ground, so I hand-launched the Lil Luscomb into the breeze and urged it into a gentle climb-out to cruising altitude. Flight time was 6 minutes, and control was adequate, but it didn't have as much authority as I like. Landing was easy and slow, but you have to make sure that you have adequate elevator throw to ensure a good flare on touchdown. For the next flight, I increased the rudder and elevator throws and tried an 8-cell pack; response was crisper, and climbout was steeper.

• LOW-SPEED PERFORMANCE

With the 8-cell pack in place, I climbed it to altitude and searched for lift. This bird loves to circle in lift, and it signals its presence with a gentle wing waggle. When you find a thermal, you can reduce throttle or even shut the motor off completely. The motor drew about 6 amps at full throttle and provided a modest climb rate and satisfying, easy cruising.

• HIGH-SPEED PERFORMANCE

The supplied Speed 280 motor didn't really have the thrust necessary for high speeds, but on my next trip to the field, I had my new AstroFlight 010 geared brushless motor and an APC 9x3.8 slow flyer propeller mounted in the Lil Luscomb's nose. I powered this combination with an 8-cell, 720mAh NiMH pack, and the performance boost was bigger than I expected: the plane became a real hot-rod! It climbed rapidly and reached thermal altitude in 30 seconds. To maintain altitude and search for lift, I pulled the throttle back to a

cruise setting. Even with a non-folding propeller, flights routinely lasted more than 25 minutes. I look forward to installing a folder to get even more thermal time. I was just amazed at the balance of performance and flight time this plane was capable of with the AstroFlight motor.

• AEROBATICS

With the application of throttle, loops from level flight were easy. I was already impressed with its performance, but I decided to swap in a 10-cell, 600mAh NiMH pack. This increased the climb rate even more and also provided very long flights. I was able to do loops and fast pylon turns at low altitude followed by repeated climb-outs to thermal altitude. After several climb-outs, I expected to experience motor sagging, but climb-outs were repeatedly strong, and the Lil Luscomb's flight performance was responsive. The AstroFlight 010 geared is very efficient and provides strong performance at just 2 to 3 amps. At 5.5 amps, where it is rated at maximum efficiency, it is really impressive.

With the AstroFlight motor installed, the Lil Luscomb really handled well, so I decided to see whether a beginner would be able to fly it. I hooked up my buddy box and invited several of the student pilots at our field to have a go at the controls. I climbed the plane to thermal altitude and trimmed it to make free-flight lazy circles, and then I handed it over to the student. It was an instant success; I only had to nudge it this way or that way to get him started and, sure enough, he flew successfully without my having to intervene.

loops and stall turns. It can easily be flown in a baseball diamond or at the field at the end of the day for relaxation after you've flown your heavy-metal planes; it circles lazily in the late afternoon rising air. When I go to the field with my larger birds, I take the Luscomb along just for this purpose. It is not limited to calm flying conditions, but I leave it on the ground if the wind exceeds 10mph; that speed breaks up the thermals, and gusts will knock the Luscomb around.

It is very easy to complete, looks excellent and displays an outstanding quality of workmanship. I like this plane a lot, but an even better endorsement might be the all the questions I get about it from my fellow

club members. They see how much I enjoy it and want one for themselves. ✈

Airtronics; 1185 Stanford Ct., Anaheim, CA 92805; (714) 978-1895; fax (714) 978-1540; www.airtronics.net.

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*Pull-start power for
a ducted fan!*



KYOSHO

F-86F

Sabre ARF

by Nick Zirolì Sr.

If you have been paying attention to trends in RC models, you are aware that almost-ready-to-fly (ARF) models have arrived in a big way. They come in all types—trainers, scale, aerobatic, fun-fly and park flyer—and sizes, from backyard flyers that weigh just a few ounces to $\frac{1}{3}$ -scale giant aerobatic planes. It was only a matter of time until someone came out with a plane like Kyosho's new F-86F Sabre ARF. This semi-scale, 39.5-inch-span warbird comes complete with a

pull-start O.S. .15 CV ducted-fan engine and fan unit, ready to install. As it is from Kyosho, the excellent quality and value of the kit come as no surprise.

In my review of the Kyosho electric Learjet in the January 2001 issue of *Model Airplane News*, I wrote how impressed I was with the kit and its performance. Like the Learjet, the F-86 is an innovative and well-engineered ducted-fan model, but that is where the similarities end. The Learjet is all sheet-foam construction; the F-86

has a fiberglass fuselage and built-up, film-covered flying surfaces. Most notably, the F-86 is powered by an O.S. .15 CV-DF engine with a pull-starter and tuned pipe, all of which are included. The colorful box is well packed, and the photos serve as a guide for applying the many graphics that dress up the model. The fuselage is fiberglass with a silver finish molded in. The built-up balsa wings and tail surfaces are covered in multicolored film; they are light and expertly built.



SPECIFICATIONS

Model: F-86F Sabre

Manufacturer: Kyosho

Distributor: Great Planes Model Dist.

Type: semi-scale, ducted-fan ARF

Wingspan: 39.5 in.

Wing area: 341 sq. in.

Airfoil: flat bottom

Weight: 58 oz.

Wing loading: 25.4 oz./sq. ft.

Overall length: 37 in.

Radio required: 4-channel; 4 servos

Radio used: Airtronics RD-6000 Super transmitter, 92777 receiver and four 94556 Microlite servos



Engine used: O.S. .15 CV-DF with tuned pipe (included)

Prop used: 3.5-inch-diameter fan (included)

Price: \$429.99

Features: fiberglass fuselage and prebuilt, film-covered flying surfaces and includes ducted fan, engine and tuned pipe; kit includes everything needed for assembly (except fuel tubing); lots of colorful graphics.

Comments: its well-engineered design looks great in the air. The F-86F requires a paved surface for taking off with wheels, but it can be bungee-launched from grass. The engine and fan unit operated flawlessly with a minimum 25-percent-nitro content (45-percent preferred). It has good flight characteristics, but it isn't for novices.

Hits

- Excellent design and parts fit.
- Very complete kit.
- Nice scale appearance that looks great in the air.
- Excellent power system.

Misses

- Many more tools required than listed in the instructions.
- Written instructions lack detail and clarity.

ASSEMBLY

• **Wing.** Construction starts with the wing. The ailerons must be hinged, and the hinge slots are precut in both the wings and ailerons. Glue the included sheet plastic hinges in place with thin CA. Glue the aileron-control torque rods into each aileron with a light coat of epoxy. Join the wing panels with 30-minute epoxy. Keep some solvent and paper towels handy to clean off the excess epoxy before it cures. Cut away the covering to glue the servo-mounting plate to the wing. I used Airtronics Microlite high-torque servos. These are shorter than the holes provided in the servo plates, so I cut the aileron plate in half and shortened it

to fit the servo. I filled the other servo mounts with scrap and glued a 1/16-inch ply piece over each end of the plate to close it up. It is necessary to drill out the servo arms with a no. 51 drill to fit the pushrod wire. Carefully lay out the holes for the front wing hold-down dowels, drill them and epoxy the dowels in place. Mount the landing-gear struts and wheels to complete the wing.

• **Fuselage.** The fuselage assembly is a little out of the ordinary, so be careful to follow the instructions, except where noted. The instructions are well illustrated with excellent photos and hardware descriptions; however, they fall short on

descriptive text. The Japanese to English translation is very poor and in some cases comical. Take time to study each step and understand it.

First, install the plywood brace for the front wing dowels and the balsa air ramp in front of it. All the plywood parts are laser cut and fit well. Open the gun ports up to 6mm. I did not find it necessary to cut notches in the wing saddle to fit the formers into the fuselage. Before installing the two formers, make sure they fit into the fuselage. They will show on the outside of the fuselage if they fit too tightly. A few passes around the outside edge with sandpaper will bring them down to the proper size. Once they fit,

FLIGHT PERFORMANCE



For grass fields, a bungee launch worked well. The Sabre looks great in the air without gear, and the performance was noticeably better. Belly-landing on grass proved no problem for the tough fiberglass fuselage.

• TAKEOFF AND LANDING

A hard surface is required to take off on the supplied landing gear; it lifted off in about 75 feet with 25-percent-nitro fuel. I didn't measure with the other fuels, but I estimate that 45-percent nitro would reduce the distance by 10 to 15 feet. The small wheels will not permit flying from a grass surface, but since most of my flying is done off grass, I wanted to try bungee-launching the F-86. I used the same 16-foot piece of 5/16-inch surgical tubing I've been launching the Kyosho Learjet with, but stretched to 26 paces, yielding 10 to 12 pounds of pull. I removed the landing gear and installed an 1/8-inch wire launch

hook in place of the nosewheel strut. Flight performance is significantly improved with the landing gear removed, and it looks great in the air. Landings on the wheels or belly are easy to perform. The sink rate is predictable and can be held off for nice main-gear touchdowns. Belly-landing on grass has not been a problem.

• LOW-SPEED PERFORMANCE

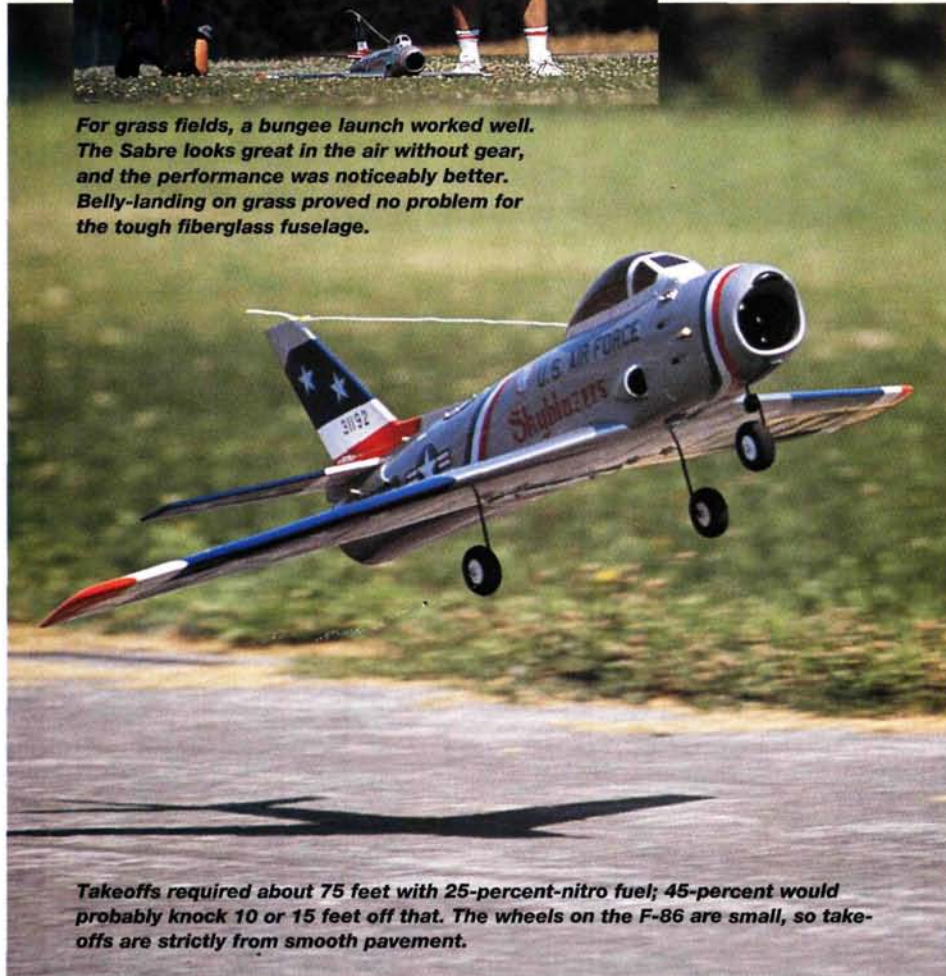
This is a jet model, and it likes to fly fast. It does not fly well at slow speeds. As it gets to a high angle of attack, it wants to spin. Keep the speed up.

• HIGH-SPEED PERFORMANCE

Once the F-86 is trimmed out, it grooves very well. Observers and pilots can appreciate the high-speed passes it makes.

• AEROBATICS

I found the F-86 to be limited, as far as aerobatics go. It does great rolls and low-level barnstorming. Loops require that you build up some speed before entry. If you enter too slowly, the plane may snap at the top, and it is difficult to recover. Observers are satisfied with high-speed passes; the F-86 looks and sounds like it is going much faster than it actually is. In spite of its limited aerobatic capabilities, it is a real crowd-pleaser.



Takeoffs required about 75 feet with 25-percent-nitro fuel; 45-percent would probably knock 10 or 15 feet off that. The wheels on the F-86 are small, so take-offs are strictly from smooth pavement.



mount the ducted-fan shroud on the front former with four screws.

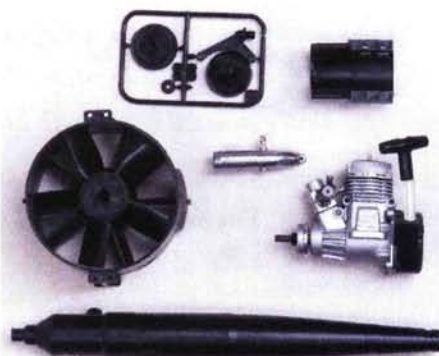
At this point, jump ahead to step 12 and make up the front former. Make sure the former fits on the shroud before you add the bell-mouth mounting ring, and don't fill the inside corners with epoxy—I used thin Zap for this. Jump ahead again to step 14. Trim the bell mouth to fit inside the fuselage and inside the front former ring against the shroud. It is much easier to do this with the parts outside the fuselage. You want a good, smooth transition from the bell mouth to the shroud. Fit the shroud and rear former into the fuselage but don't glue anything yet. Epoxy the wing screw-mounting plate in place. It is critical that this is located correctly, or the front former will not fit. The front edge of the plate must be back from the wing opening at least 17mm. I made a simple depth jig to position it. Mount the wing and make sure it is square to the fuselage.

Put the front former in place and secure it to the shroud with four screws. The shroud-former assembly should be located so the rear face of the aft former is even with the front edge of the engine hatch. Tack it in place with thick CA or epoxy. Install the pushrod and fuel tubes and epoxy or CA the formers permanently; I used a bead of Flex-Zap II. Now epoxy the bell mouth to the shroud and fuselage. Next, epoxy the curved, plywood screw plates inside the engine-access opening. It will be very difficult to do this at step 34 (as the instructions recommend) when the area is all cluttered with the engine, fuel lines and pushrods.

carburetor and pressure tap. These are much easier to connect before the engine is all the way forward in the shroud. For some reason, fuel line is not included. This is strange, since it is such a complete kit and the box states "Everything except a radio and starter set included"; but the instruc-



The engine installation preserves the clean lines of the F-86, the engine hatch provides adequate access to the components, and you won't find a more convenient ducted-fan startup procedure than the O.S. .15 CV.



The included O.S. .15 CV-DF pull-start engine and ducted-fan unit makes this kit very attractive. Installation is relatively simple, the unit works flawlessly and since there is nothing else to buy, it's a real value.

tions correctly note that it must be purchased separately.

Mark the hole locations for the needle valve and rear tuned-pipe mount. The needle valve's height is 90mm, but it would have been better at 85mm. I drilled an $\frac{1}{8}$ -inch hole on the opposite side of the fuselage for access to the idle-mixture screw. This .15 has an auto-mix-type carburetor usually found only on larger engines. Make a $\frac{3}{4}$ -inch needle-valve extension from pushrod wire. Next, install the fan and spinner; this requires a 12mm socket and a 2.5mm Allen wrench. These are not mentioned in the required tools list. Though also not mentioned, it would be wise not

to tighten the drive nut against the pull-starter, as this may damage the ratchet or starter cord. I inserted a piece of hardwood into the shroud to prevent the fan from turning while the drive nut was tightened. Add the spinner to complete the engine installation.

Next, install the nosewheel assembly; this requires a 1.5mm Allen wrench. The nose-inlet cap is also epoxied into place at this time. I made a change here: I was certain that with the engine and tuned pipe so far aft, this would be a tail-heavy model and would require a fair amount of nose weight. Because of this, I picked the largest battery I could fit in the space provided—an Airtronics flat 6V, 500mAh Ni-Cd pack. I cut a hole over the inlet to allow the battery to extend as far forward as possible and did not epoxy the inlet cap on at this time so more weight could be placed inside it, if required. Screws and decals hold it securely without epoxy.

A flat, space-saving fuel tank is included that is designed to reduce the internal fuselage drag, and it has fill, vent and feed lines. Hook-and-loop tape holds the tank in place. The motor includes a priming bulb like those seen on larger gas engines. For easy engine starting, it really is required because there is no access for an electric starter to spin the engine fast enough to draw fuel on

its own, and the carburetor intake cannot be reached for choking. There is a fuel-system diagram, but it is not clear which fuel line is going to which fuel-tank outlet. Also, there is no mention of where to locate the fuel fill or that it must be plugged after filling so the pipe pressure can work. I chose to epoxy a piece of $\frac{1}{8}$ -inch tubing into one of the gun ports and connect it to the fill tube that goes to the bottom of the tank (remember that you are working upside-down through the wing opening). I capped the fill tube with a short piece of fuel line with a plug in one end. This fuel system works very well; the engine run was reliable from takeoff to landing.



• **Tail.** Next, complete and install the tail surfaces. Epoxy the wire elevator horns into the elevators and insert the elevator hinges into the pre-cut slots, as was done with the ailerons. Epoxy the stabilizers and screw them into place. Hinge the rudder to the fin. Jump ahead a step before you epoxy the fin in place; it is a lot easier to install the pull/pull horn assembly before the fin is on the fuselage. Now epoxy the fin in place. Add the red graphics to the base of the fin and stabilizer before you install the pull/pull cables. Mount the rudder servo in the center of the mounting plate. A small hole must be cut in the bottom to reach the front servo-mounting screws, and I made up the pull/pull cable ends in reverse order of the instructions—servo side first then to the rudder horns. Setting the cable length is critical and much easier to do outside the fuselage. Drill out the servo-arm hole for the nosewheel-pushrod connector with a no. 48 drill bit. The steering pushrod goes on the opposite side of the servo from the rudder connection to synchronize steering and rudder throw.

Fit and glue the cover plate below the stabilizer inside the tailpipe. Solder the threaded links to the ends of the elevator pushrods. Insert the pushrod through the proper guide tube, and connect the links to the elevator horns. Adjust the links so both elevators are the same at neutral. Mount the elevator and throttle servos, drill the servo-arm holes and connect the pushrods. Mount the switch as shown, then wrap the battery and receiver in thin foam padding and position them in the nose, battery first. The space is tight, but my Airtronics 92777 receiver easily fits. Set up all control-surface throws as instructed.

Cut the required notch and hole on the engine cover, and screw it in place; the plywood screw plates are already epoxied in place. Drill a no. 58 hole through the cover into the fuselage at each screw location. Pre-thread each hole in the fuselage by inserting a screw. It takes a lot of pressure to screw it in, so support the inside with your fingers to prevent damaging the fuselage. Be sure this cover is in place before you fly the F-86.

• **Canopy and graphics.** Trim the tinted canopy to fit the fuselage. I trimmed it to

the lines molded in and found it to be a little small, so cut it oversize and trim to fit. I didn't like the idea of cutting big holes in the canopy sides for additional air to the fan. This

is a nice-looking model, and I felt it ruined its appearance; besides, flush side holes are not very efficient. If a hole is necessary, why not make the canopy clear, so it isn't so visible? The front three window sections could be cut out, leaving just the canopy framework. This would look better and make a much more efficient air scoop. It might even make the non-scale fuselage side scoops unnecessary. I chose not to cut the holes where instructed. I test-flew the F-86 without holes and then cut the flat wind-



To help balance the model with a minimum of additional nose weight, a hole was cut above the air inlet to move the battery as far forward as possible. Note also the fuel fill tube mounted in the gun port. Remember to cap the line so the pipe pressure can function.

screen out. There wasn't a significant performance increase, but it does supply more air to the fan, and the hole is much less noticeable than it would have been on the side.

Two large graphics sheets must be cut out and applied to the model. A 3-view in the instructions and the box art serve as a guide. Cut out each item, lay it in place, and mark its position with pieces of masking tape at each corner. I used Windex to help position the bigger pieces.

FINAL TOUCHES

The last thing to do is balance the model. The specified balance point is 185 to 195mm back from the wing's leading edge at the fuselage. I added 1½ ounces to balance it at 190mm. I had not attached the inlet cap in anticipation of adding weight inside it. After test flights, I added another ounce to balance it at a more stable 185mm.

It will become apparent the first time you

prepare to run the engine that it is difficult to tell when the fuel tank is full. Watch the overflow line that runs to the tuned pipe through the canopy; when fuel flows through it, the tank is full. I tilt the fuselage back on its tail and pull the starter cord so the piston closes the exhaust port. With the exhaust closed, the engine won't flood if fuel gets into the exhaust manifold. Be sure to cap the fill line before you start the engine.

There is no mention of what nitro content the fuel should have, but these smaller engines like a high nitro fuel. I started with 25-percent-nitro content, which worked OK; I later obtained some Wildcat "Promix" 45- and 65-percent-nitro content fuel to see how this might improve performance. After testing all three, I feel the 45-percent is the best choice. It raises performance without raising the cost too much, and it's still easy on glow-plugs. For those who want power at any cost, Wildcat 65 percent is the way to go.

On the first flight, the F-86 was overly sensitive to both pitch and roll. I added an extra ounce of nose weight to bring the balance point to 185mm behind the leading edge. I also reduced the aileron throws a little. I recommend no more than ¼-inch throw each way. If you have duel rates, set the low to ⅛ inch—it doesn't take much. The recommended ⅜ inch of elevator travel was good. One last change I made to help stability was to reflex the ailerons up ⅜ inch for neutral. Lay a straightedge on the bottom of the wing parallel with the silver and blue separation line, and adjust the links for a ⅜-³²-inch space between it and the trailing edge of the aileron. This adjustment reduces its tendency to spin at low speed.

CONCLUSION

The Kyosho F-86F, typical of all Kyosho products, is very well engineered and manufactured. This is not a model for the novice, and Kyosho tells you that up front. It is fun to assemble, though the instructions leave the builder guessing at times. The quality of all the parts is excellent, the workmanship is outstanding, and during all of our flight tests, the engine ran flawlessly. Trimmed properly, the model flies very well; spectators and fellow modelers really enjoy watching this F-86F Sabre in the air. ✚

Airtronics, 1185 Stanford Ct., Anaheim, CA 92805; (714) 978-1895; fax (714) 978-1540; www.airtronics.net.

Kyosho; distributed by Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826-9021; (217) 398-6300; fax (217) 398-1104; www.kyosho.com.

Wildcat Fuels, 3005 Park Central, Unit T, Nicholasville, KY 40356; (606) 885-5619.

Berryloid Trophy

by Don Carkhuff

Many of us have seen "old-timers" at our fields and featured in magazines, but I have seen only one reproduction of the "Berryloid," and it was hanging in the Academy of Model Aeronautics (AMA) museum, simply identified as the "Berryloid Trophy Winner." I discovered this model in 1978 while I was reading a magazine that featured reprints of previous articles; the model was designed by H. Covert and originally appeared in the November 1938 issue of *Air Trails*.

The finished model shown in this article is 23 years old and still going strong. Though the O.S. .30 isn't quite as peppy as it used to be, it powers the model with authority. The model shown in the construction photos is the second Berryloid model I built. It isn't difficult to put together, but there are some unique features and assembly techniques involved. Assembly instructions and drawings are on the plan; study them before you begin construction. The following tips should fill in any gaps.

SPECIFICATIONS

Name: Berryloid Trophy Winner

Type: old-timer RC-assist

Wing span: 72 in.

Wing area: 735 sq. in.

Weight: 82 oz.

Wing loading: 16 oz./sq. ft.

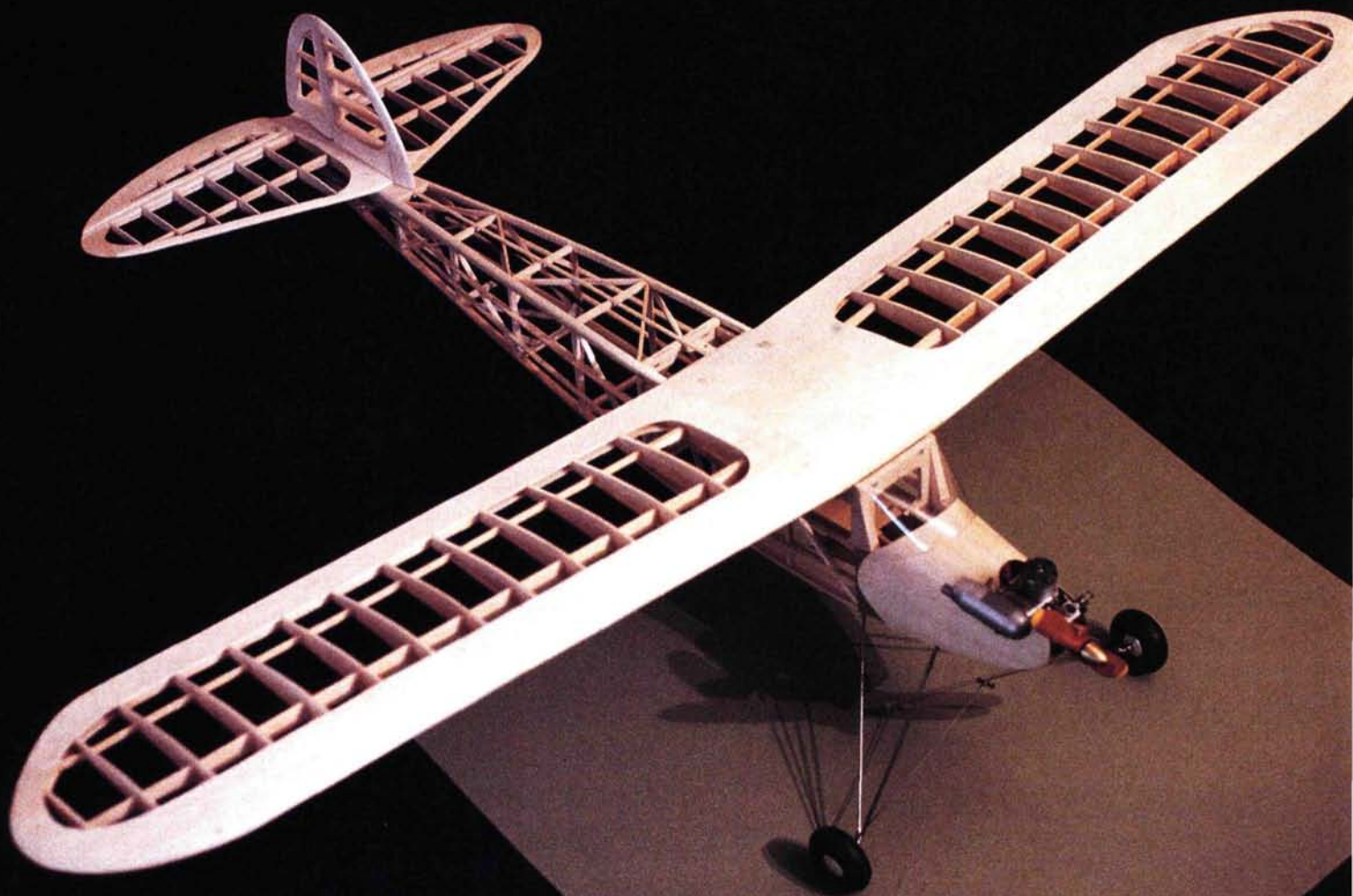
Length: 52.5 in.

Engine size: .30- .46 2-stroke

Radio req'd: 3-channel (rudder, elevator and throttle)

Prop used: 11x4

Comments: designed by Don Carkhuff, the Berryloid is an RC-assist version of a classic free-flight design, and it uses conventional balsa and ply construction. The plan is highly detailed and include instructions and assembly drawings.



Winner

An RC-assist version of an old classic



Here is my original RC-assist Berryloid old-timer. It is 23 years old and still going strong.



CONSTRUCTION

The model's structure is quite strong and should not be reinforced anywhere. "Beefing it up" will only add unnecessary weight.

Fuselage. Before you begin, see if your engine fits between the engine-mount rails. The rails can be modified if required, and if you use an engine larger than .30ci, some side thrust is suggested. After you've worked out the engine requirements, cut the rails out of hardwood, drill the mounting holes, and install blind nuts for the bolts.

Select the best, most evenly matched wood for the four longerons; unequal stiffness will make them difficult to bend evenly when you're joining the sides. Cut the formers and fairing pieces to shape, and draw centerlines on all the formers to help keep the fuselage straight during construction. Glue F-1 and F-1a together, being sure to keep glue out of the slots. Make two F-17s (one right and one left) and one F-18 wing mount, so they will be



My granddaughters help with the Berryloid; it's a family thing!

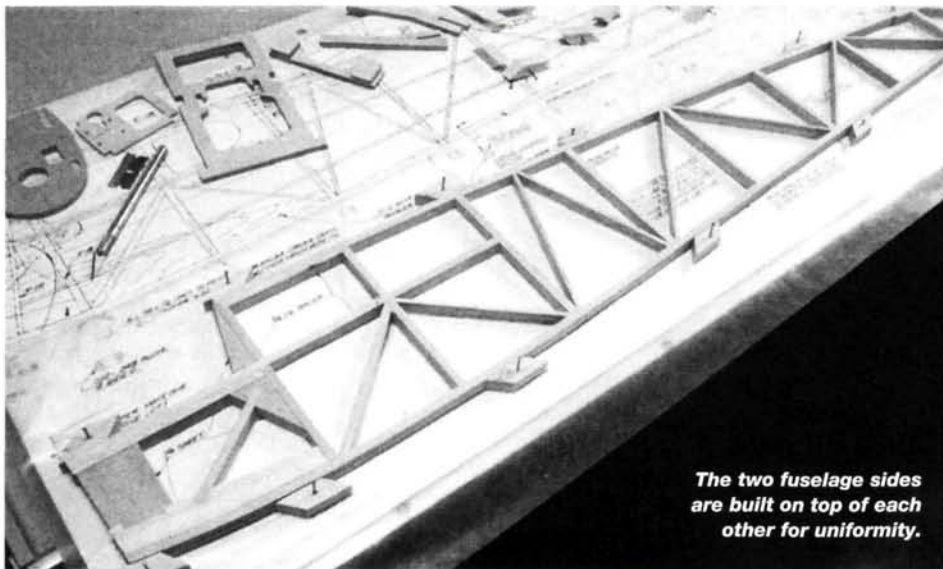
ready when needed.

Build the side frames using the drawing at the bottom of the plan as a guide. The sides must be identical, so build one side on top of the other. With the sides completed, sand the angles into the tail ends, being sure to make a right and a left side. Join the sides by fitting them into the slots in F-1; make sure they fit properly. Clamp formers F-1, F-3 and F-4 into

position before you pull the tail ends together. Sight along the formers' centerlines to make sure the fuselage is straight, and then glue the formers into place; don't glue the tail yet.

When the glue has dried, remove the clamps. Attach the tail-wheel steering-arm bearing to F-6, and then install the former and glue the tail pieces together. Now add the wing-mounting members F-17, F-18 and former F-5. Install the plywood F-11 and F-12 doublers, and then install the landing-gear mounts (with the blind nuts installed). Add the engine-mount rails and servo beams, all the crosspieces and diagonal members, and the F-15,

CONSTRUCTION: BERRYLOID TROPHY WINNER

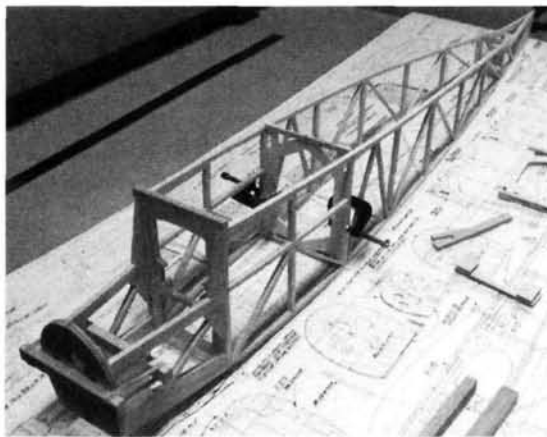


The two fuselage sides are built on top of each other for uniformity.

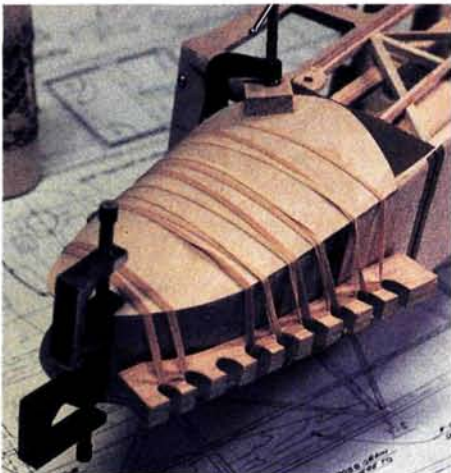
F-19 and F-20 fairing pieces, and then trim the tail to shape using F-19 as a guide. Glue a hardwood wing-mount cross-member to former F-3 and to the F-21 wing saddles. Complete the fuselage framing by adding the stringers and the longeron caps, the fairing members and the sheeting.

The plywood window frames can be glued into place flush with the fuselage sides, or you can glue them to the outer surfaces and then feather their edges with balsa or filler. Before adding the plywood cowl, taper the sides of the balsa cowl bottom and the front corners of the engine-mount rails.

Test-fit the cowl until it bends cleanly all the way around F-1 and F-2; when you're satisfied with its fit, glue the cowl into place. Fuelproof both the engine compartment and the fuel-line cap with a coat of epoxy or butyrate dope.



The side frames and the front formers have been joined, and the tail ends have been clamped together.



The cowl sheet has been trimmed and is held around the formers with rubber bands. Note that my clamping stick is shaped to match the fuselage contour.

Wing construction. The wing is assembled as one piece over two full-length spars that are made with the dihedral angle, sweep angle and a straight center section all built in. Each spar has one joint in its center that's reinforced by two plywood braces. Although the 72-inch-span wing is one piece, you can assemble it on a 36-inch building board.

Start by cutting out the ribs. I made an aluminum template of rib W-4 and cut all of the ribs with that and a sharp hobby knife. Build the wingtips now so that they will be ready when needed.

Spars. Follow the spar construction details given on the plan; select the straightest spruce you can find. (Once I used yardsticks for material because I could not find any-



This shows one of the spars being glued and clamped to produce the required angle.

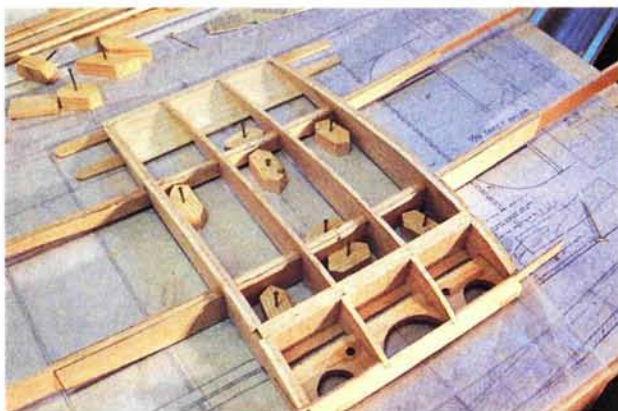


The completed wing panel. Note the shims under the TE sheeting and that the spars are one piece.

thing straighter.) Keep the dihedral angle of both spars equal. The best way to do that is to build the rear spar on top of the main spar. Be sure the glue joint between the first dihedral brace and the spar is completely dry before you glue and clamp the second brace to form the sweep angle.

Center section. When you've completed the spars, build the center section following the drawings. To keep the ribs seated firmly across the width of the bottom

trailing-edge (TE) sheeting, shim up the sheeting $\frac{1}{16}$ -inch. Also do this when you build the wing panels; I used Popsicle sticks for the shims. When you attach the spars to the center section, make sure the ribs' spar slots are wide enough to accept them without distorting the ribs. If



With the spars in place, the wing center section takes shape.



Above left: the forward wing-mounting plate is in place. This part mates up against the wing-mount cross-member that's glued to former F-8. Above right: the wing has been installed on top of the fuselage, and the mounting-screw support pieces are in position.

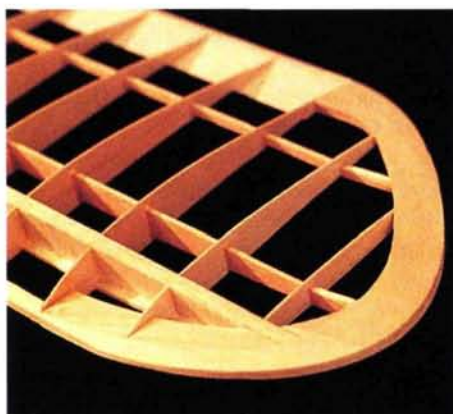


necessary, widen the slots so the spars slip into place easily, but be careful not to change the spacing between the spars. Slight gaps in the glue joints aren't a problem, since triangle stock will be added later for reinforcement. Before you permanently glue the spars, make sure they are parallel with each other.

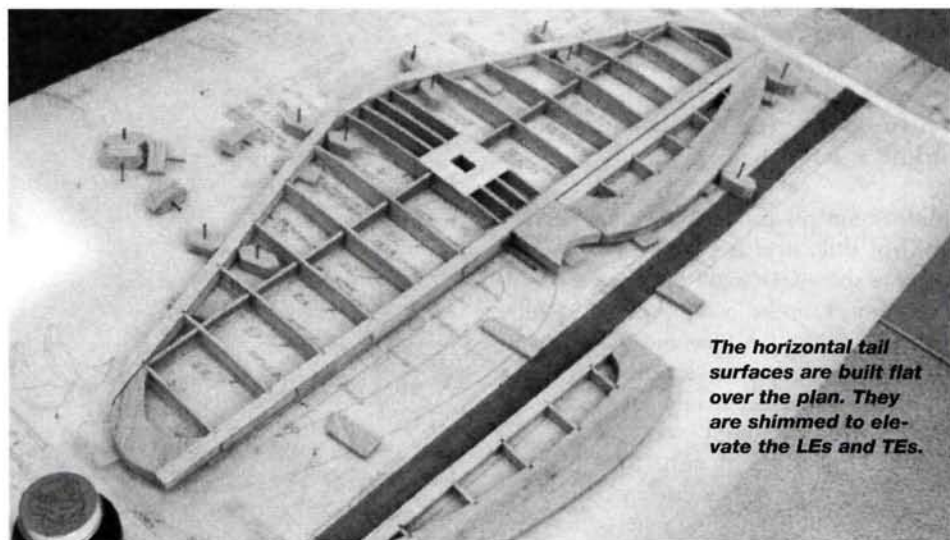
Finish building the wing by adding the bottom center-section sheeting, the front and the rear wing mount support blocks and the top sheeting.

Tail surfaces. Cut all the pieces out of straight-grain, warp-free medium-weight balsa sheet. When you laminate the tip

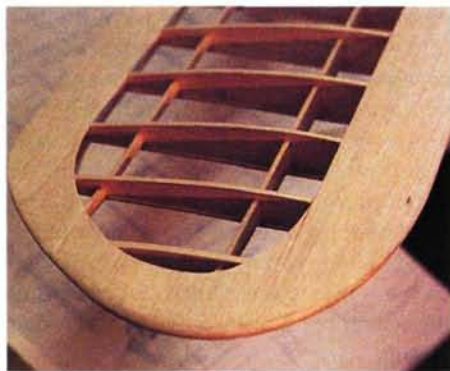
TE (also shimmed up). Pin and glue the TE to the tips, keeping everything centered. Now slide the ribs onto the spar. Fit, trim and adjust each rib before you glue all the parts together. Add the four S-1 ribs, and when the glue has dried remove the stab from the building board. Add the S-8 sheet doublers and the center sheeting.



The wingtips must be shaped to match the ribs' contours.



The horizontal tail surfaces are built flat over the plan. They are shimmed to elevate the LEs and TE.



All of the wing sheeting has been added and sanded smooth.

When building a wing panel, support the opposite panel (or spars) with a piece of wood placed under each spar. Before the $\frac{1}{16}$ -inch top sheeting can be added to the wing, you'll have to carve and sand the tips to match the ribs' upper curve.

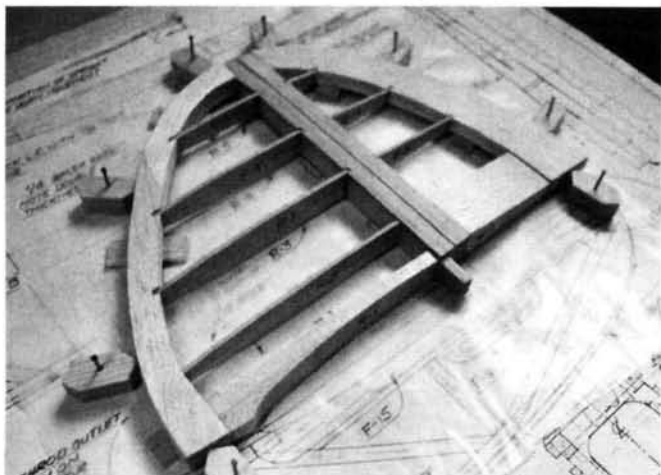
pieces together, keep the grain direction as shown on the plan. Cut the stab spar out of spruce, and mark the locations of ribs, S-2 to S-7. Cut the ribs slightly oversize (about $\frac{1}{32}$ -inch longer on each end) so that when you glue them into place you can trim them to fit. Cut a $\frac{5}{32} \times \frac{5}{32}$ -inch groove in the stab's center fairing piece to clear the elevator tie (joiner wire). Place the tie in the groove and glue the fairing to the stab's TE; make sure it doesn't bind with glue. Also, glue the $\frac{1}{8} \times \frac{1}{4}$ -inch hardwood stiffener to the front of the TE; be sure to keep the stiffener and fairing centered.

Pin the leading edge (LE) parts to the plan and place $\frac{3}{16}$ -inch shims under them, as shown on the plan. Join the LEs with the triangular balsa piece and the plywood reinforcement. Add the tips and

Assemble the elevator halves and drill holes in their LEs for the wire tie. Tack-glue the elevators to the stab with $\frac{1}{32}$ -inch balsa pieces between them. These scrap pieces make separating the elevators and stab easy after they have been sanded to shape. Cut the elevators free and shape their LEs, then cut the hinge slots. Add the rudder-tiller bearing block last. Keep the opening in the center sheeting to clear the vertical fin.

Fin and rudder. These surfaces are straightforward and do not require much explanation. Cut all parts as shown, noting the overlapping joints in the LE and TE pieces. The fin's LE is blocked up with $\frac{1}{8}$ -inch shims and the rudder TE pieces are blocked up with $\frac{3}{16}$ -inch shims. Ribs R-6 and R-7 have building tabs that keep

CONSTRUCTION: BERRYLOID TROPHY WINNER



The rudder and fin are also built flat over the plan.

them at the correct elevation when they are pinned to the plan. Note that the fin and rudder can be built individually or, if you prefer, they can be built as one unit and then separated after they've been sanded.

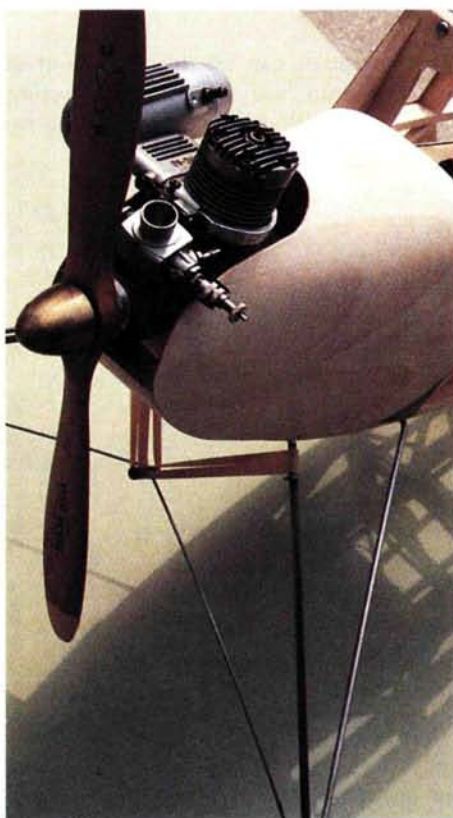
Finish by adding the 1/16-inch sheeting and sanding the LE and TE as shown in the cross-sections. Now is a good time to check the fit of the fin and the stab. The fairing below the rudder can also be shaped at this time.

Rudder control arm and tiller. The rudder-control tiller arm is bent at a 90-degree angle as shown. To make the 3/32i.d.x5/32o.d. brass tube, I slipped two pieces of K&S tube together. Solder the tube and the eyelet to the tiller as shown in section "C-C," and then file a flat surface on the tube to accommodate the rudder horn's setscrew.

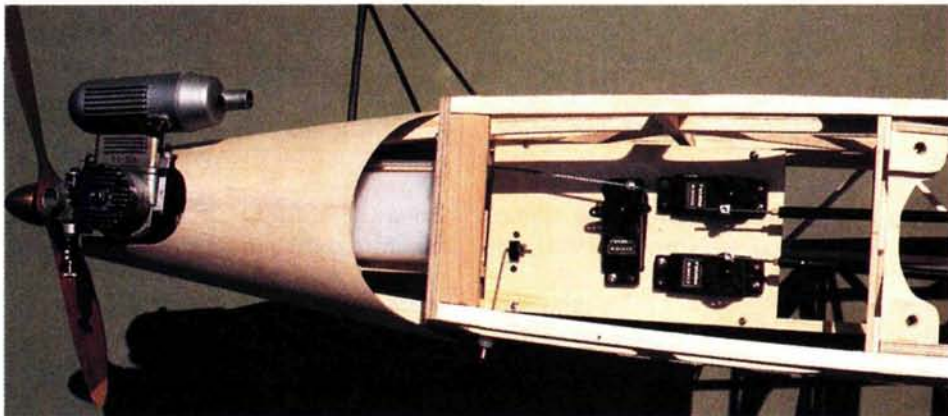
Make sure the stab seats tightly along the entire width of the fuselage. The fuselage sides will have to be relieved to clear the bearing block. When you're satisfied with their fit, clamp the stab into place and temporarily install the tiller and horn; the horn should extend out through the side of the fuselage as shown in the top

view. Dry-fit fairing piece F-16 to the fuselage so the horn arm is centered in the slot. Position it far enough forward to allow the horn to be turned forward through the slot and back into the fuselage. When you're satisfied with its position, glue F-16 into place.

Landing gear. Bend the wire struts as shown on the plan. The struts are held together with soft wire wrapped in place and soldered. Before joining the struts,



The completed cowl sheeting with the engine being test-fitted into place.



The fuselage with the radio gear and the engine installed.

don't forget to slide the washers that retain the rubber bands in place. Form the tailwheel strut, slip the tailwheel on, and solder the retaining washers and brass tube into place. Trial-fit the strut in the bearing, making sure that the arm (with a clevis attached) is free to pivot; remove material from the nearby upright to give the necessary clearance.

Equipment installation. To support the battery, I cut a block of rigid foam to fit behind the firewall and under the tank; the battery fits in an opening cut in the foam. The fuel tank, cushioned with soft foam, rests on the block. A second foam block supports the receiver and is against F-3 under the servo board. Temporarily install the servos and clamp the stabilizer into place with the rudder tiller installed. Install the tailwheel assembly, make the pushrods as shown, and then install them through the windshield opening. Connect the pushrods and adjust as necessary. When you're satisfied with everything, remove all the hardwood and the equipment.

Covering and final assembly. The original H. Coovert model was covered in silk with a doped finish; it was cream with a brown trim and a white pinstripe. My RC-assist version has a similar color pattern: cream and tan Monokote and a red pinstripe.

Cover the fuselage bottom, and attach the tailwheel strut and control arm. Assemble the rudder pushrod by slipping the long section through the fuselage side and connecting the short leg to the tailwheel control arm. Next, cover the left side and slide the elevator pushrod into place. Now cover the stab; leave the bottom where it contacts the fuselage clear of covering. Install the rudder tiller and control arm, making sure the arm is at 90 degrees to the tiller. Make sure the retaining screw is tight. Temporarily clamp the stab into place, attach the rudder pushrod, and check the tailwheel and rudder movement. When you're satisfied with it, glue the stab into place. Finish by assembling the remaining tail surfaces and the rudder fairing.

Glue the windows into place from the inside. After the glue has dried, cover the edges of the windows with strips of MonoKote. To hold the windshield in place, I made an aluminum frame that I attached with small flathead screws. The model should balance as shown on the plan; make whatever adjustments are necessary to accomplish this.

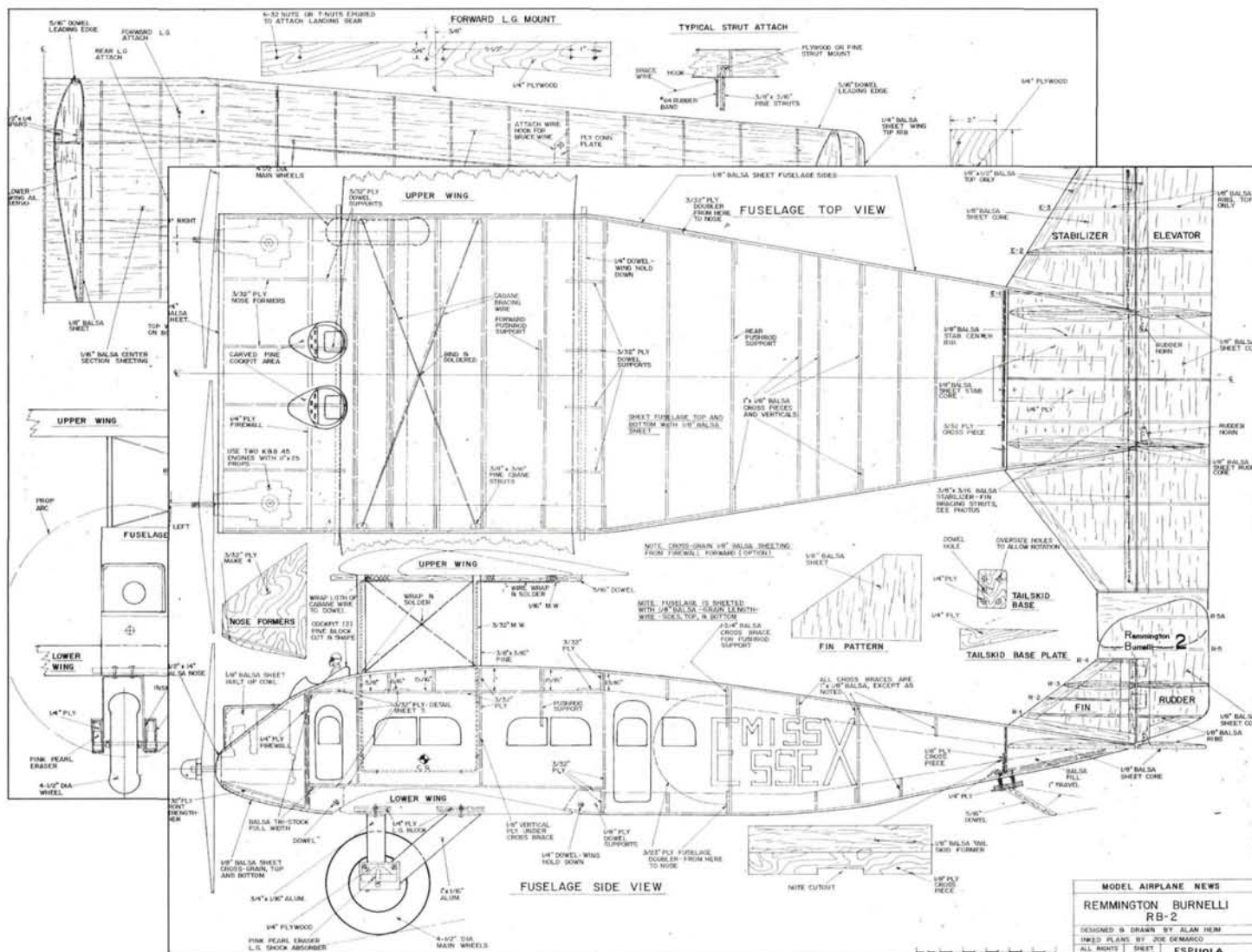
FLIGHT PERFORMANCE

As you might expect from a model originally designed as a free-flight, the Berryloid is very easy to fly. Though light wind isn't a problem, I strongly recommend that you make your first flight in calm weather, as this plane can be a handful when the wind blows. Stay away from gusty weather and crosswind takeoffs and landings. Ground handling is good, without any tendency to ground-loop, despite the forward location of the model's landing gear. I attribute this to my use of a low-pitch propeller and slow throttle application on takeoff.

I originally used an 11x4 prop, but now I use a homemade 12 $\frac{1}{2}$ x3 prop. Most of the time I fly the model at less than $\frac{1}{2}$ throttle, and the 6-ounce tank provides 15-minute flights with a large reserve left over. I use full throttle to perform barrel rolls and loops and these maneuvers are fun to execute, but cruising



around at $\frac{1}{2}$ throttle and making large figure-8s at a 20-foot altitude is what I enjoy the most.



To order the full-size plan, turn to "RCStore.com" on page 180.

Over the years, building and flying model airplanes of all types, has given me a great deal of pleasure. Even today, after building many larger and more involved airplanes, the Berryloid has summed up all my pleasures. I hope you will enjoy the model as much as I do. ✈

K&S Engineering, 6917 W. 59th St., Chicago, IL 60638; (773) 586-8503; www.ksmetals.com.

MonoKote; distributed by Great Planes Model Distributors Co., P.O. Box 9021, Champaign, IL 61826-9021; (800) 682-8948; fax (217) 398-0008; www.greatplanes.com.

O.S.; distributed by Great Planes Model Distributors Co.

Berryloid Trophy Winner FSP1201A

Designed by Don Carkhuff, the Berryloid is an RC-assist version of a classic free-flight design, and it uses conventional balsa and ply construction. The plan is highly detailed and includes instructions and assembly drawings.

WS: 72 in.; L: 52.5 in.; power: .30-.46 2-stroke; 2 sheets; LD 2. \$19.95

Reports from readers around the world!

Chilliwack Electric Fly-In

Send in your event coverage. Mail photos, captions and text (500 words or less) to "Grassroots," *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. Color slides and prints are acceptable.

Nestled in the mountains one hour outside of Vancouver, British Columbia, Canada, is Ron Dodd's farm, home of the Fairfield R/C Club's flying field. This unassuming site boasts spectacular mountain views, a neatly mown runway and an over-fly courteously padded with young hay. For six years, this site has been host to the Memorial Day Electric Fly-In. The event continues to grow each year, and last time, 75 pilots attended along with many spectators and families.

I got up early on Saturday morning eager to catch the first official flight of the meet, and I didn't have to wait long. In the calm morning air, I caught Robert Fishwick of Vancouver, BC, flying his Litestick. It seemed fitting to start the fly-in with a plane that represents a growing facet of our hobby.

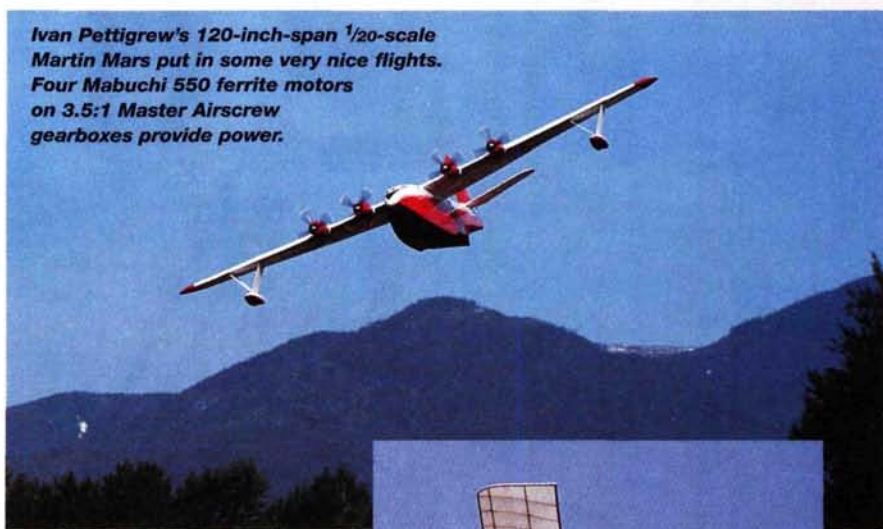


Left: Robert Fishwick of Vancouver, BC, gathered a small crowd at 7:30 a.m. and put on the first flight of the meet with his Litestick.

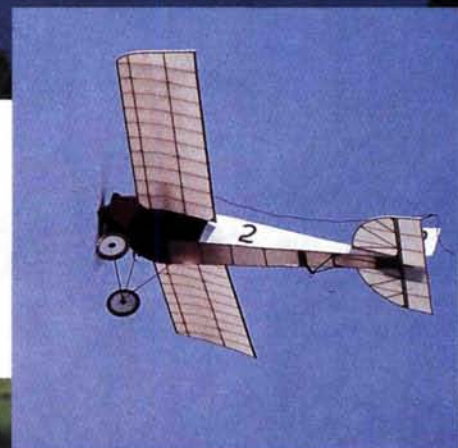
Not long after Robert's flight, we took a short trip to a pond for float flying. Hal Norrish was the first off the water; his plane can best be described as a distant relative of the Mitch Polling Aquasport. Up next was Bernard Cawley's Hobby Hangar Scout. Powered by a 7-cell, 2400mAh Ni-Cd or a 3000mAh NiMH, a Jeti 15-4 brushless motor and a 30-3P speed control turning an APC 9x4.5 electric prop, the Scout practically leaps off the water and offers very long flights.

One highlight of the float event was Ivan Pettigrew's 120-inch-wingspan Martin Mars. Ivan is a Chilliwack local and is well known for his scale efforts and his ability to build light-weight models; both attributes were evident in the Mars. Powered by four 550-size ferrite motors, this plane really flies with authority. An all-up weight of 10 pounds, 5 ounces, spread over an impressive 1,515 square inches of wing area, explains why Ivan says it flies like a trainer. Flight times lasted about 10 minutes, and the Mars got everyone's attention.

Hal Norrish, another local, also put in some nice flights on his CL-215, which is powered by two Ruby Trinity car motors geared 6:1 on 17, 1700mAh cells. This is a great example of how an inexpensive power system can make a spectacular model.



Ivan Pettigrew's 120-inch-span 1/20-scale Martin Mars put in some very nice flights. Four Mabuchi 550 ferrite motors on 3.5:1 Master Aircscrew gearboxes provide power.



Above: Hal Norrish's scratch-built Eastborne monoplane runs on a Speed 400 6V geared 6:1 with a 12x8 prop.



Left: Brad Trent of Vancouver gets a hand bringing his Beaver back to shore after a flight.



Randy Smith's 1/3-scale J-3 cub has a 105-inch span, weighs 16.3 pounds and is powered by a geared Astro 90.



Above: Ron Dodd, host of the event, won the award for best WW I plane with his scratch-built Edecker.

Right: Jeff Breece converted this Sig Seniorita to electric by using a Magnetic Mayhem Reverse RC car motor with a Master Airscrew 2.5:1 gearbox and a 12x8 prop. With full flaps, this .25-size plane can fly within the boundaries of the runway and with enough power to climb out very aggressively.



Left: Norm Cecil had a 27-percent-scale Staudacher powered by an unusual Astro brushless motor; the magnets are mounted in the outer case, and the case spins.



Ivan Pettigrew's PBV-5A Catalina has functional retracts that withdraw into an open space between sealed bulkheads. The space can be filled with water, which drains through holes in the hull after takeoff. Foam filler-plugs in the bottom of the hull prevent too much water from accumulating.

When we returned to the field, many interesting planes were in the air. One was Norm Cecil's Top Flite Gold Edition P-47—a fantastic plane that was nicely finished and skillfully flown.

Next, I found Russ Tront with Jeff Breece of Kent, WA, trimming out a cute-looking canard based on a Sig Riser wing. Powered by nothing more than a pair of geared Speed 280 motors, the canard could provide long, cruising flights.

Randy Smithhisler of Edgewood, WA, had a nice collection of Cubs with him, including a 105-inch-span, 1/3-scale J-3. Powered with an Astro 90 on a standard Astro gearbox and 36 cells, the model's flight was extremely scale.

Russ Tront, Glen Peden and Fred Bronk all put in great flights with their helicopters, although the award would have to go to Glen for tearing the biggest hole in the sky with his Logo 20. It truly spent less than 25 percent of its 6-minute flights upright. Glen couldn't find enough good things to say about his Logo, which he set up with a Plettenberg HP300/25/A3 H, a Schulze Future 35 speed control and 24, 2400mAh batteries.

Russ got nice, long flights out of his Ikarus Eco 8 outfitted with an Aveox 1015/2YA, Kontronics 3SL-40-6-18 controller and a Panasonic 10-cell, 3000mAh NiMH. His aerobatic flights lasted 8 to 9 minutes, but his cruising flights lasted up to 16 minutes.

Some of the day's last flights were made by slow flyers, which seemed to fit into the event really well. Slow-fly pilots hopped in whenever there was a break in the action.

Awards were given out after the Saturday barbecue, which was generously hosted by Ron Dodd and his family. Fred Bronk of Vacaville, CA, received the award for greatest distance traveled. The award for most aerobatic flights went to Steve Cheung of Vancouver and his Aveox-powered profile Hots, which he built from a *Model Airplane News* plan. Todd Long won the "Ron's Choice" award for his Lorenz Silent Dream; Ivan Pettigrew won Best Scale for his Bristol Freighter; Norm Cecil was awarded Best WW II Plane for his P-47, and Ron himself took Best WW I Plane for his Edecker. I earned the award for Best Park Flyer/Slow Flyer for my Demoiselle, which had been featured as an RC *MicroFlight* plan.

On Saturday night, Bernard Cawley got everyone's attention with his LT-25 equipped with TEC Systems Night Ops for night flying. Everyone gathered at the flightline to watch Bernard put on two aerobatic flights. I had never seen the Night Ops system up close before and have to say I was very impressed.

On Sunday morning, Bill Warner of Kent, WA, practiced precision flying with his Zagi. It was probably the most common plane at the event; it's a lot of fun to push your limits when you are flying a nearly indestructible plane.

Sunday was a little cloudier, but it was still an excellent day of flying. Todd Long's Silent Dream pattern ship and Anton Eiselle's Speed 480-powered Twin Otter were definitely two of the highlights. The variety and quality of models at the event were first-rate.

Despite the excellent attendance, this event retains a comfortable and casual atmosphere. The flightline was rarely full, and there were plenty of opportunities for all levels of pilots and planes to fly. With good weather and a fantastic group of modelers, this is an event worth attending. I'll definitely be back next time!

For information on next year's event, contact Ron Dodd at rondodd@aol.com or (604) 792-6814 (between 5:30 and 9:00 pm Pacific Time), or log on to www.canadianelectricflight.com.

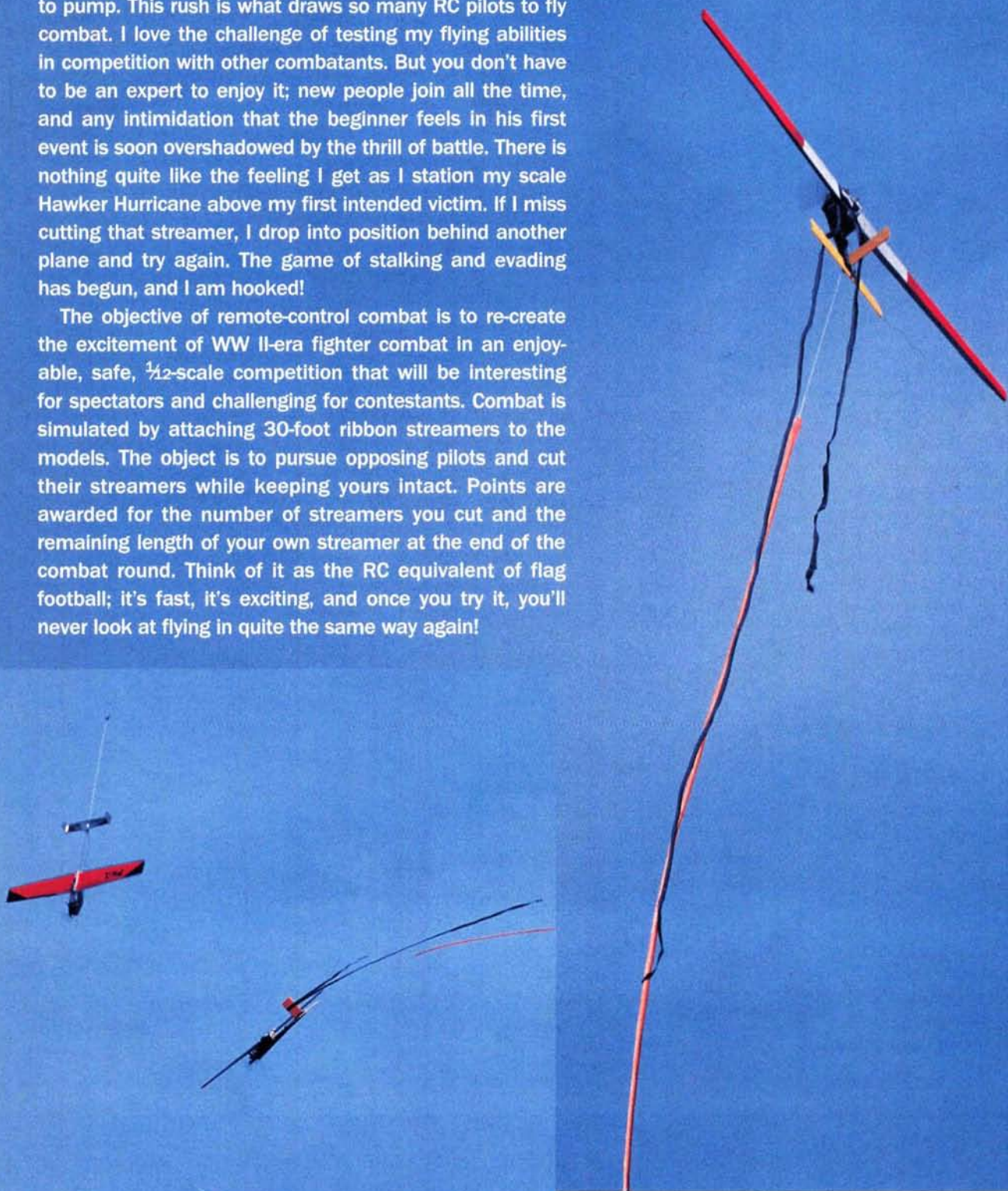
RC COMBAT

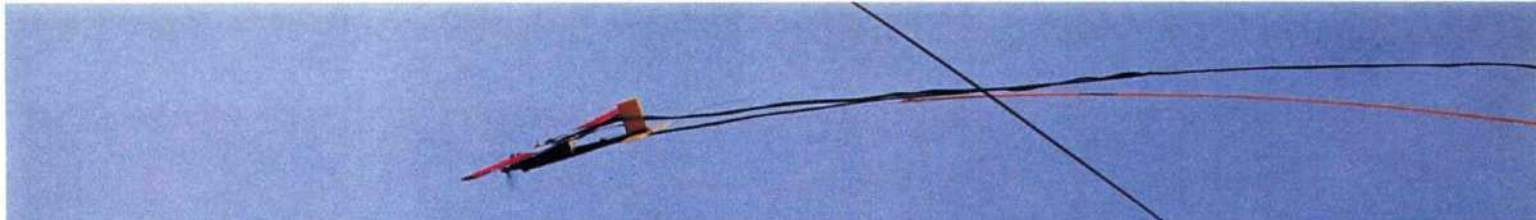
by John S. Reid

Every time I stand on the flightline preparing for an RC combat competition, I get a feeling of intense excitement that never diminishes no matter how many times I compete. When the contest director shouts "Ninety seconds begins now!", I feel the adrenaline start to pump. This rush is what draws so many RC pilots to fly combat. I love the challenge of testing my flying abilities in competition with other combatants. But you don't have to be an expert to enjoy it; new people join all the time, and any intimidation that the beginner feels in his first event is soon overshadowed by the thrill of battle. There is nothing quite like the feeling I get as I station my scale Hawker Hurricane above my first intended victim. If I miss cutting that streamer, I drop into position behind another plane and try again. The game of stalking and evading has begun, and I am hooked!

The objective of remote-control combat is to re-create the excitement of WW II-era fighter combat in an enjoyable, safe, $\frac{1}{12}$ -scale competition that will be interesting for spectators and challenging for contestants. Combat is simulated by attaching 30-foot ribbon streamers to the models. The object is to pursue opposing pilots and cut their streamers while keeping yours intact. Points are awarded for the number of streamers you cut and the remaining length of your own streamer at the end of the combat round. Think of it as the RC equivalent of flag football; it's fast, it's exciting, and once you try it, you'll never look at flying in quite the same way again!

*Become a
weekend warrior
in aerial action*





Terry Harner (right) helps Sean Gault reinforce a Bf 109 for another round of combat. Combat fliers rely on quick-setting glues and tape to get back into the air fast. Before flight can resume, all repairs are safety-inspected by the contest director.



This used to be an F4U Corsair. Sometimes, no amount of glue or tape will get you back into the competition!



Scott Bilinski readies his plane during the 90-second start window. Once the start is announced, Scott has 90 seconds to start, launch and be in the air with a full streamer before the round begins.



PHOTOS BY JOHN S. REID

The RCCA

Borganization that governs RC combat is the Remote Control Combat Association (RCCA). Its to provide a fun, safe and organized system for this popular and exciting facet of the RC . The RCCA is working with the AMA to bring RC combat to more modelers; the AMA tly holds combat events on a provisional status, and it has formulated a set of rules govern- RCCA events. Here is an overview of the RCCA regulations:

- **Classes.** Most contests have Open and Scale classes. The Open class includes any plane that has a single engine under .30-cubic-inch (ci) displacement. If there are enough participants, the Open class is often broken down into three subclasses, according to engine size: 1M: up to .061 ci; A: up to .15ci; B: up to .30ci
- Weight for any class cannot exceed 3.5 pounds dry.

To qualify for Scale combat competition, the model must be a 1/2-scale replica of any plane in service between 1935 and 1955 that was armed with guns used for offensive purposes (no bombers). Scale is divided into two classes, again according to engine size:

- 2105: single engines up to .21 ci
- 2610: single engines up to .26ci, or **twins** with a combined displacement of up to .30ci
- Single-engine planes may weigh a maximum of 3 pounds dry.
- Multi-engine planes may weigh a maximum of 4 pounds dry.
- Any plane legal in 2105 can be used in 2610; both Scale-class planes can compete in Open class.

- **Points.** The contest requires the attachment of a 30-foot streamer to your plane, and you must fly with other planes in a designated combat zone. Your mission is to cut the streamers on the opposing planes while keeping your streamer intact, thereby scoring points. After four or five rounds, all points are tallied and the pilot with the most points wins! Pilots score points for a timely launch, staying airborne for the duration of the round, snagging opponents' streamers and landing with their own streamer as intact as possible. Judges may assign point deductions for non-engagement or for crossing the designated safety line. Repeated safety violations can result in disqualification.

For more information about RC combat events in your area, or to see about becoming a member, visit the RCCA website at www.rccombat.com. You may also email the president of the RCCA, Chris Shepherd, at shep@rccombat.com, or send mail to: RCCA, 19130 Madden Rd., Churubusco, IN 46723.

BECOMING COMBAT-READY

RC combat can be tough on equipment. During a fast and furious dogfight, some casualties will inevitably occur among the airplanes. But you can do a few things to your model to make it more durable without sacrificing performance. I learned most of the following modifications from my RC combat buddies. Combat fliers are always looking for ways to strengthen planes without adding too much weight. Decide for yourself whether these methods will work for you.



1

I always begin by using basswood spars; you can use carbon-fiber rods, but I prefer to use those for the leading edge. As shown in the photo, attach the carbon-fiber rod to a leading spar with thick CA or epoxy. Be sure to rough up the rod with some sandpaper to give the glue some bite. Next, sheet the entire bottom and the front half of the top of the wing. Set it aside, and let all glue joints dry completely. Double-check that all of the joints are completely dry and solid!



2

Purchase some minimal-expansion spray-in-place foam (the kind that is sold at home improvement stores to insulate houses). It is vitally important that you use minimal expansion foam, or it will blow off your sheeting when it expands—a big mess! Fill each wing bay about $\frac{1}{4}$ full. The foam adds reinforcement to the open bay areas and bonds all parts of the wing together, making it incredibly strong.



3

The foam will expand to fill in the bay and may begin to extrude past the spars. If you spray too much and it starts to billow out in large amounts as it expands, clean up the excess by shaving it off with a stick before the foam becomes sticky as it dries.



4

Once the foam becomes sticky, using a stick to shave off the overflow will get messy. Wait until the foam dries and then cut off the excess with a hobby knife. Some slight bulging of the balsa sheeting between the ribs might occur from the foam's expansion; this should disappear in about 48 hours when the foam has completely dried. After the bulges disappear, you can finish-sand the wing. With the wing halves joined and all of the sheeting done, reinforce the center of the wing with fiberglass cloth. It should extend at least 3 inches toward each side of the centerline on a $\frac{1}{2}$ -scale model. Use epoxy or thin CA to glue the glass cloth.



5

At this point, prepare your wing for your favorite covering. Like many other combat fliers, I like rip-stop nylon for my wing and fuselage covering; it can be found in fabric shops and is relatively inexpensive. Its advantages are strength and light weight; it is less likely to tear when struck by a sharp object such as a spinner from a combat opponent, and the blow will be dissipated over a larger area, causing less damage to the plane's structure.

Begin by sanding the balsa smooth and cleaning it with a tack-cloth. Mix some Elmer's glue 50/50 with water, and brush the mixture directly onto the balsa; I use disposable foam brushes. If you have a hard time seeing where you've applied the mixture, add some food coloring to it.



6

Lay the fabric over the glue-treated balsa, and work the material smooth using your hands or your brush. Apply more of the glue mixture on top of the nylon to smooth it out. The glue should soak into the nylon and adhere to the wood underneath.



7

Cut the excess material with scissors or pinking shears, and brush the edges of the nylon smoothly around to the other side of the wing. I like to allow one side to dry completely before I start the other. After you have both sides covered and dry, apply a coat of dope to strengthen and fuelproof the material.

The finished combat plane is ready for its first flight. The reinforcement techniques used here will help this Hawker Hurricane from Check Six Plans stand up to the rigors of competition.



8

Modifications such as these have given me the confidence to maneuver a little more boldly in combat. In evading an opponent, I've swept down so low that my plane has come back with leaves stuck to its leading edges. Moves like that may draw a startled "Watch out!" from my judge, and I may hold my breath for nearly the entire 5-minute round, but the extra strength of these building techniques helps my Hurricane return to the pits unscathed. I check the glow plug, fill the tank, and I am ready for the next round!

HINTS AND STRATEGIES

• If you can, bring at least two combat planes to a competition. In the very first round of my first match, I collided with another plane. Total flying time: 2 minutes. My first competition was over before I even calmed down.

• The contest director provides the streamer material, but it is the pilot's responsibility to cut it into 30-foot lengths, and it can be tedious to roll five to 10 streamers by hand. I use a battery-operated drill with a small Phillips screwdriver to roll up the streamers. Chuck the screwdriver blade into the drill with the handle out. Wrap the end of the streamer around the screwdriver handle and turn on the drill. The streamer will wrap around the handle into a nice tight roll. Keep it rolled up until the plane has been launched; the streamer will unravel by itself, and this will reduce the chance of its catching on something and ripping off during launch.

• I always check my glow plug between rounds. Glow-plug drivers with meters are great for this. I have changed a glow plug within the 90-second start window, but it isn't much fun.

• The goal of this contest is to cut streamers. My first time out, I was mystified why the streamers did not catch on my wings the way they did on other planes. One pilot landed with four streamers hanging from his

wings. It was then that I noticed the double-sided tape on the leading edge of his wing. I was trying to grab an opponent's streamer using only my 9-inch prop. Learn from my frustration; use double-sided tape on the leading edge.

• I try to start my engine and get airborne as quickly as possible. I use the time before the start of combat to trim out the plane and to line up on an opponent. When "start combat" is signaled, I am ready to attack, but I keep away from the other planes so I don't lose my streamer before the start of combat.

• With so many planes in the air, it's important to keep your eyes on your plane. I use my peripheral vision to locate opponents with streamers attached so I can steer my plane in their direction. I once took my eyes off

my P-51 Mustang to look for a good target, and I had some tense moments trying to find my craft again in the swarm of planes (including four other P-51s) that filled the air.

• In the beginning, I had a problem getting behind other planes. I would go left, and everyone else would go right. I learned from one of the

better pilots to just circle or loop until the other planes come back around. Then it's time to straighten out and give chase.

• Never utter the word "Deadstick!" out loud. I did once, and a pack of pilots followed my poor lame plane right down to the runway.

• Never be afraid to ask anyone at the event for help. I have attended many types of RC plane competitions, and you won't find a friendlier group of people anywhere. All of them go out of their way to help beginners. They share building tips and flying strategies and provide anything anyone needs to get them in the air. At one combat event, I had a frequency conflict with another flier. Two pilots offered me their backup radios so we could all fly in one round. At the end of the competition, the pilot I had the conflict with offered to split the cost of new crystals for my radio so we would not have that problem again. Where else would that happen? Once the planes get into the air, however, all these friendly people will go after your streamer like sharks in a feeding frenzy. All's fair! 4-



A successful launch by Scott Bilinski.

Pilots gather for pictures before the start of the Palomar Combat competition in Palomar, CA.



Air-Kill Products; (916) 332-4661;

www.rccombat.com/sectioniis/mantiaitirers/kits_airkill.asp?Links=13

6&Users=38; airkiH@jps.net.

Al Culver kits; (208) 875-1347;

www.rccombat.com/sections/manufacturers/kits_adver.htm;

alc@potlatch.com.

Check Six Plans;

www.checksixplans.net;

jlewis@i-c.net.

Combat Goblin Models;

<http://fly.to/csm>.

Cutting Edge Models; (707)

445-3525; www.biittlefloyd.com;

mail@battlefloyd.com.

DBWModels; (208) 684-9365;

www.rccombat.com/scctkms/inanufactiirers/kits_dhw.htm;

Pilot704@genrtech.com.

Grin's Underground Lab;

<http://users.oldwiz.net/~ttong/>.

Gus Morfis Plans; (310) 378-5679;

www.rccombat.com/sections/manufacturers/kits_morfis.htm.

CDMBAT KIT MANUFACTURERS

Hobby Hangar; (321) 727-8227;

www.hobbyhangar.com.

House of Balsa; (760) 246-6462;

www.mag-web.com/rc-modeier/hobnew/.

JDB AeroTec; (765) 474-1738;

www.jdbaerotec.com; jdb@wcic.cioe.com;

JK Aerotech; (503) 663-4081;

www.jkaerotech.com.

Jukka's Plans; www.dogfight.rplanet.com;

takamaci@yahoo.com.

K&A Models; (505) 994-8083;

www.kamodels.com/kitindex.htm.

Lynch's Hangar; (517) 673-7116;

www.lynchshatger.com;

vlyitc@centuryinter.net.

McClain Wing Cores;

(509) 536-9454;

www.rccombat.com/sections/manufacturers/kitsjncdain.htm.

Middle Wallop; www.midwalrc.com;

gerry.vandyk@midwalrc.com.

Pica Enterprises; (305) 932-8008;

www.picaweb.com.

Precision Aero; (262) 567-5341;

www.precision-aero.com.

Progressive Miniature Aviation; (800)

325-4277; www.rccombat.com/sections/manufacturers/kits_pma.htm.

Quad Models; www.rccombat.com/sections/manufacturers/kits_ijitad.htm.

Quality Aircraft; (561) 879-2772;

www.rccombat.com/sections/manufacturers/kits_ijualityainraft.htm;

gbaUard@tcoast4ez.com.

Radical R/C; (937) 237-7889;

<http://members.ciol.com/davthacker/radicalrciitltx.htm>.

Ron Daniels Designs;

<http://liomeiown.aol.com/rwdrc/index.html>.

RS Combat; www.aircombat.cz/combatshop/.

SPAD; www.spadtotliebone.com.

Texas Twins R/C Aircraft;

(941) 497-0078;

www.texastwinsrcaircraft.com.

Tower Hobbies; (800) 637-6050;

www.towerhobbies.com.

Triple Threat Hobby;

(248) 644-5682;

www.rccombat.com/sections/manufacturers/triple_threatjobbyhm.

TuffFlight; (315) 699-8550;

www.tiffight.com/liomeiown.aol.com/rwdrc/index.html.

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Wallace R/C; www.rccombat.com/sections/manufacturers/Aits_wallace.htm;

BOBWRC@aol.com.

War Zone Models; (716) 227-0592;

www.rccombat.com/sections/manufacturers/kits_warz.one.htm;

warzonemodells@email.msn.com.

Warbirds Ltd; www.warbirdsltd.com.

Waverly R/C; (877) 786-2309;

www.wawrc.com.

Ziggs Originals; (608) 249-4480;

www.rccombat.com/sections/manufacturers/kits_ziggs.htm;

ziggs@execpc.com.

ZDZ 40 RV-L

A powerful, lightweight gasoline engine with rear induction

by Gerry Yarrish

The popularity of gasoline engines used in giant-scale models is at an all-time high. There's no question that they are reliable, easy to start and adjust and economical to operate. If there's anything about them

to criticize, it would be that the average gas burner is big and heavy when compared with equally powerful 2-stroke glow engines. This is because most popular gas engines can be traced back to industrial applications such as chainsaws, lawn trimmers and other power tools. This is no longer the case with the new generation of engines specifically designed for model airplane use. They are lighter and more compact and enjoy great popularity, especially with the scale-model building fraternity.

RC Showcase (RCS) specializes in designed-for-model-airplane-use powerplants and offers many excellent lightweight and powerful engines. (See my RCS 1.40 engine review in the December 2000 issue). RCS also distributes the ZDZ engine line that includes the 40, 60, 80, 120 and 160cc engines. For this review, I ran the new ZDZ 40 RV-L engine. Let's take a closer look.

FIRST IMPRESSION

The first thing you'll notice when you hold the 40 RV-L in your hands is that it just

The new ZDZ 40 RV-L is a lightweight, impressive 2.4ci gas engine that's perfect for scale airplanes. The engine comes with a microprocessor-controlled, Falkon electronic ignition system; the unit goes into standby mode if the engine sits idle for more than 1 minute.

doesn't look like a gasoline engine. It's more like a high-performance glow engine with its narrow front end and rear-intake layout. The engine is also very light for a 40cc (2.4ci) gas burner—2.9 pounds without ignition system! A reason for this is that it comes equipped with an electronic ignition system; there's no magneto, coil, or condenser. In general, I prefer rear-intake engines because their internal layout produces a very strong crankshaft, and these engines can be concealed easily in a scale airplane's cowl.

The ZDZ 40 is not just a rear-intake engine; it is equipped with a rotary-disc intake valve (see sidebar on next page). Another nice feature is its 6-bolt prop-hub assembly; it improves scale appearance and prop-attachment security. There is no single-bolt option for the engine, nor is it recommended by RCS. All things considered, the 40 RV-L looks and feels like a high-quality piece of equipment.

SPECIFICATIONS

Engine: ZDZ 40 RV-L
Distributor: RC Showcase
Type: single-cylinder gasoline engine
Bore: 38mm (1.5 in.)
Stroke: 35mm (1.37 in.)
Displacement: 40cc (2.4ci)
Weight: 2.9 lb. (3.4 lb. with ignition system)
Horsepower: 4.8 @ 8,000rpm
Dimensions: 6.6 in. high; 6.8 in. from carb to prop hub; 3.3x 2.4 in. mounting footprint.
Props used: (see "Prop Performance" chart)
Price: \$450; \$99.95 for inverted Pitts-style muffler (optional)
Comments: the ZDZ 40 RV-L is designed for model airplane use and is not a converted industrial engine. It is very light for a 40cc engine and has a rear-intake design with a rotary-disc intake valve. The engine is ideal for scale model airplanes.

ENGINE CASE

Another reason the engine is so light for its size (the "L" in its name stands for "lightened")

is its three-piece, investment-cast cylinder and crankcase. The engine is manufactured with very little unnecessary material while still maintaining adequate support for the piston and main bearings. The cylinder and rear end plate are bolted to the crankcase and sealed with gaskets. The cylinder has three transfer ports molded into place, and the internal surface of the cylinder (there is no sleeve) is



The three-piece, investment-cast engine case has an attractive bead-blasted exterior finish. The roughened surface helps dissipate heat.

The cylinder inner surfaces are plated with Nikasil—tough coating of silicon carbide and nickel.

plated with Nikasil. This material is used in high-performance marine and motorcycle engines and is a durable blend of silicon-carbide and nickel. The plating is very hard and slippery (minimizing internal friction) and has good heat-transfer properties. The forged piston and connecting rod are connected by a hefty wristpin that's held in place with two C-clips. The flat-head piston has an iron ring, and both the upper and lower ends of the connecting rod are equipped with caged roller bearings for reduced friction.

The solid crankshaft is supported by two large SKF sealed ball bearings and has a large counterbalance web and crankpin. Because the crankshaft is not drilled out and machined to form



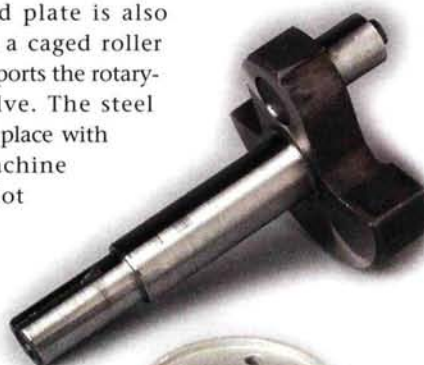
Both the piston and the connecting rod are forged, and the conrod is equipped with caged roller bearings.



a front intake valve, it remains rigid and strong. The front end of the shaft is drilled and threaded for the prop-alignment shaft that also secures the prop hub assembly in place. A slot is milled into the front of the shaft to fit a 1/2-inch-long key that prevents the hub from turning around the shaft.

The rear end plate is also equipped with a caged roller bearing that supports the rotary-disc intake valve. The steel valve is held in place with a pan-head machine screw, and a slot cut into the front face of the disc mates with an extension pin that protrudes from the main crankpin.

The large intake passage is cast in place and is directly fed by a Bing 48 pumper carburetor. Two bolts hold the carb in place, and a phenolic spacer separates it from the case and prevents the carb from getting too hot. If you remove the carb, be sure you reinstall it so that the pressure transfer holes in the end plate and spacer line up with the carburetor's pressure-induction hole. If they don't line up, the carb will not function properly.



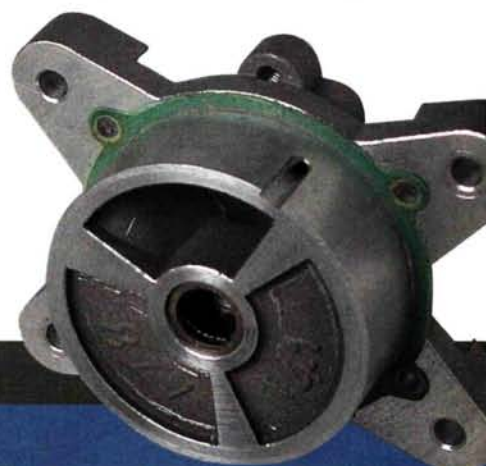
The crankshaft is solid and heavily counterbalanced. The prop hub is keyed in place to prevent slippage. Note the small extension pin protruding from the crankpin.

IGNITION SYSTEM

My engine came with a Brisk UR17 resistor spark plug and a nicely designed locking collar. You slip the plug into the collar before you screw the plug into the cylinder head. A small setscrew tightly secures the metal spark-plug cap within the collar. The cap can be quickly and easily removed—no clumsy twisting and tugging required here!

The high-tension spark-plug lead is covered with a metal shielding that helps prevent ignition "noise." The Falcon ignition module has a compact metal case and features a microprocessor-controlled advance/retard function. Its voltage range is from 4.5 to a maximum of 6 volts.

Because a fully charged pack can deliver more than 6 volts, 5-cell Ni-Cd packs without a voltage regulator are

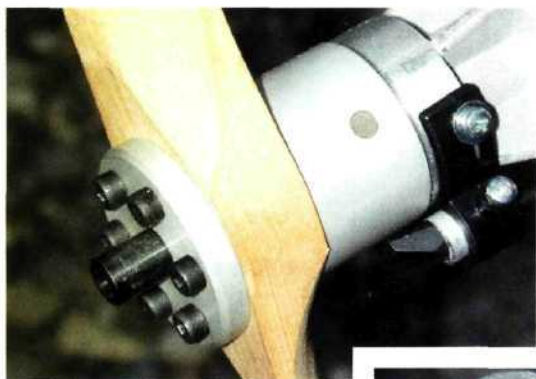


Here you see the rear end plate and steel rotary-valve intake valve. The disc is supported by a caged roller bearing seen in the center of the end plate.

ROTARY-DISK INTAKE

A standard feature found on many high-performance engines, the rotary-disc valve provides excellent throttle response especially at higher revs. Driven by a pin extending aft from the main crankpin, the disk has an opening in it. As the opening passes the intake port, it effectively opens and closes the port passage. Coupled with a pumper carb, this rear induction setup provides very efficient fuel flow into the crankcase and bypass ports. More durable than a reed-valve induction setup, the disc valve is standard equipment on the ZDZ engines.





Above; just behind the prop, the Hall-effect magnet and ignition timing sensor can be seen. Note the 6-bolt prop attachment. Right: I really liked the spark-plug boot and collar arrangement. That small setscrew holds the metal boot securely in place and makes it very easy to remove the boot.



A Bing 48 carb allows the engine to breathe and is attached to the end plate. The easy access to the choke and needle valves is apparent.

not recommended by RCS. I used a Fromeco Reliaswitch (available from RCS) with my 5-cell, 1000mAh battery pack. At full throttle, the average current drawn from the ignition battery is about 600mA.

The ignition-timing sensor is held in place with a molded bracket that is slotted for two small attachment screws. The Hall-effect magnet that triggers the sensor is in the side of the prop hub. The sensor's position (and the timing of the engine) can be adjusted by loosening the screws and sliding the bracket up or down.

ENGINE PERFORMANCE

Because ZDZ engines have a high compression ratio (10:1), RCS recommends 93-octane gasoline. Regular 87-octane fuel burns more quickly than premium gas does and can cause fuel detonation that reduces power. For break-in, I used a wooden 18x10

Zinger prop and a 40:1 fuel/oil mixture containing petroleum-based oil. After running about a gallon of fuel, I switched to a 50:1 mixture (with Klotz synthetic-blend oil) for the tests. I left the ignition timing at the factory setting.

From the very beginning, the ZDZ 40 was very easy to start. Close the choke, open the throttle to full, switch on the ignition system, and flip the prop several times until the engine "coughs." This signifies that there's enough fuel in the engine for a hot start. Open the choke, bring the throttle down to about 1/4 and flip the prop again. Most of the time, my engine started on the second flip and settled into a high idle. After the engine had broken in, it wanted to start immediately after it coughed (even with the choke closed). Had I been able to open the choke fast enough, it would have started.

The engine has a nice smooth transition from idle to full power, and it holds a consistent top-end rpm setting. With a 20x10 prop, it holds a reliable 1,800rpm idle, but this is dependent on the size and weight of the propeller. This is one of the best engines I have ever run, and I am completely happy with its quality, performance and operation. If you're looking for a 40cc engine for your next giant-scale airplane, give the folks at RCS a call; you'll love their ZDZ engines.

Klotz Special Formula Products Inc., 7424 Freedom Way, Fort Wayne, IN 46817; (800) 242-0489; fax (219) 490-0490; www.klotzhtbe.com.

ZDZ Engines, distributed by RC Showcase, 3442 Grough Dr., Waldorf, MD 20602; (301) 374-2197; fax (301) 374-2493; www.rcshowcase.com.

Zinger; distributed by J&Z Products, 25029 S. Vermont Ave., Harbor City, CA 90710; (310) 539-2313.

PROP PERFORMANCE

PRDP	TYPE	SIZE	MAX. RPM	IDLE RPM
FlyTec	wood	21x12	5,900	1,500
APC	composite	20x10	7,300	1,900
Menz	wood	20x10	6,800	1,800
Zinger	wood	20x10	6,700	1,850
Master Airscrew Classic Series	composite	20x8	7,450	1,850
Clark Industries	wood	20x8	7,200	1,850
Menz	wood	18x12	7,500	1,920

These tests were run with 93-octane gasoline with 50:1 fuel/oil mixture (Klotz synthetic blend). The engine was equipped with an RCS inverted Pitts-style muffler. Conditions: air temperature 75 degrees F; barometric pressure 30.06 in.; humidity 64 percent.

The ZDZ 40 on my test table during prop testing. The engine can pull fairly large props with ease.



Scale Gun Turrets

Bringing a WW II bomber to life

by Charlee Smith



Turrets are among the most eye-catching features on a WW II-era bomber. Without the time spent to make them right, none of the beautiful scale detail on this PBJ-1H could be fully appreciated.

I'll admit it: I'm a WW II bomber nut, and my favorite bomber feature has to be the powered gun turret. Turrets give a bomber its character. A B-17 just isn't the same without its top turret, and the addition of a powered turret "made" the A-20G Havoc. A P-61 Black Widow without the four-gun turret just doesn't have the same character. The B-50, the B-32 and the PB4Y-2 are among my favorites because they seem to have turrets sprouting everywhere. And these turrets had function to back up their fearsome looks; the powered gun turrets manufactured by companies such as Martin, Emerson, Boulton-Paul, Sperry and Bendix saved the lives of countless airmen during WW II.

For sheer firepower, I've always felt that the B-25 Mitchell has no equal among WW II aircraft. Its Bendix top turret downed more Japanese aircraft than any other WW II bomber did. When Wing Mfg. introduced its Pro-Series B-25, I knew that my lifelong goal of building an authentic RC B-25 was within

reach. But no matter how accurate the rest of the airframe appeared, I knew I wouldn't be satisfied if I didn't get the top turret right. I've collected a library of B-25 information over the years—factory drawings and manuals, and numerous books and magazines—but none of it contained the detailed information I needed to replicate the late-model Bendix turrets used in B-25Fs and Hs. Even direct contact with Bendix was a dead end. To my rescue came Pat

Habel, a member of the team that keeps the B-25H "Barbie III" flying.

In discussing our mutual interest, Pat was able to provide me with copies of the Bendix turret operation and service manuals and parts catalog! Within a month, I had the last piece of the puzzle I needed to build the plane of my dreams.

TOP TURRET

The most important part of the turret—the clear, molded-plastic canopy—is provided with the Wing Mfg. kit. I wanted the turret to rotate, so I relocated bulkhead F6A 1¼ inches farther aft to eliminate interference. The cross-sections from the rear of the canopy to the rear of the bomb bay are constant on the B-25 fuselage, so the bulkheads can be moved without a problem. The first part to be made is an ⅛-inch lite-ply disc that matches the inside diameter of the plastic canopy base. I rough-cut it with a Dremel jigsaw then threaded a ¼-inch screw through its center and chucked it into a tabletop drill press that, along with my Dremel Moto-Tool, acted as my lathes for various parts of the B-25. I then carefully sanded the disc to the correct size to be press-fit inside the canopy base.

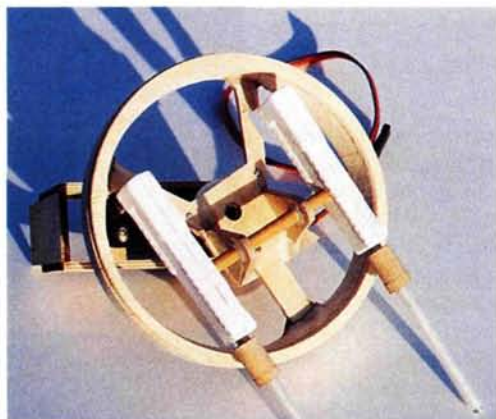
Next, I laminated a ½-inch balsa disc of slightly larger diameter to the lite-ply disc using CA. I wrapped the bottom of the clear canopy with masking tape and placed it over the plywood disc. Then I placed the whole assembly in the drill-press lathe. I turned the balsa down with a sanding block so it matched the outside diameter of the canopy. I then cut out three sections from the disc with a Dremel saw, leaving a Y-shaped structure that supports the center portion. I waited until the aircraft was entirely finished and painted to glue the canopy into place.

Using the wooden disc as a guide, mark the position of the turret on the top of the fuselage. Carefully cut away the balsa sheathing and its stringers with a Dremel tool. At this point, I discovered that the ¼-inch-square spruce stringers get in the way. To get the turret to sit in the proper

Turret rotation required that one of the fuselage bulkheads

be moved back 1¼ inches. Since the fuselage cross-section size is constant between the canopy and the bomb bay, this was easily accomplished. Right: correct placement of the turret required that the spruce stringers be cut down. They were reinforced with graphite sheet, but in hindsight, a better method would have been to move them down in the fuselage instead of cutting them.





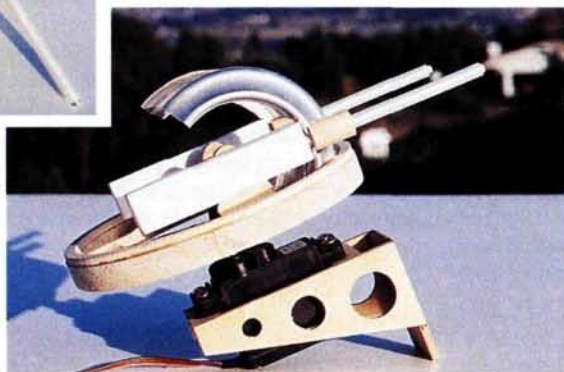
Above: note the dowel and plywood supports that allow gun elevation adjustment. Pieces of fuel tubing in the supports create enough friction to hold the guns in a set position.

Right: Wing Mfg. offers a scale .50-caliber machine-gun kit for the B-25. The blast shields were cut from the bottom of an aluminum soda can.

them in with thick CA. Then remove the tape from the turret base and sand the ply in the spots that prevent the base from rotating freely (nothing ever comes out perfectly round).

GUNS

Wing Mfg. makes a .50-caliber Browning machine gun kit for the turret that's



position, more than half of the spruce stringers had to be removed. To compensate for the loss in strength, I laminated $\frac{1}{32}$ -inch graphite sheet to the bottom of the remaining spruce with thick CA. If I had to do it over, I would reposition these stringers $\frac{3}{8}$ inch lower, between bulkheads F5A and F6A, before I sheeted the fuselage.

The fuselage cutout is made slightly over-size for the turret base. Line the inside of the cutout with two $\frac{1}{2}$ -inch-long strips of $\frac{1}{4}$ -inch ply, with their joints on the fuselage centerline. Put masking tape around the balsa turret base (to provide the necessary gap) and apply it to the fuselage to hold the strips in position while you glue

available separately. I glued a balsa block in the center of the two guns during their assembly so that a hole could be drilled in their sides to connect them with a piece of $\frac{1}{8}$ -inch wooden dowel. This dowel runs through the two $\frac{1}{8}$ -inch aircraft plywood vertical supports shown in the pictures. The supports have fuel-tubing inserts that provide the necessary friction to hold the guns in any position. By putting the dowel in my Dremel tool, I made two grooves using a small round file that matched the spacing of the supports. This keeps the dowel centered correctly while the guns rotate from horizontal to vertical.

Finding uses for common items while

detailing a scale aircraft is one of the joys of our hobby. The air-blast shields that are attached to the .50-caliber guns to seal the slots in the Plexiglas canopy were made by cutting out the bottom of an aluminum soda can using a fiber-reinforced Dremel cutoff disc. The shape comes very close to the real thing, and it even comes in a natural-metal finish. For the ammunition feed chutes that are visible on the B-25 in the waist and glass nose positions, I used flexible wristwatch bands of an appropriate size. Again, their natural-metal finish adds to the realism. They do add weight, but I felt they were worth it.

The full-size Plexiglas dome is reinforced with strips of Plexiglas bonded to its inside. To simulate this, I ran parallel lengths of $\frac{1}{4}$ -inch chrome tape, $\frac{1}{8}$ inch apart. For the distance between the machine guns in the turret to be correct, the slots in the clear plastic dome must be cut so that the guns will be 2.2 inches apart, which is farther out than indicated on the plastic canopy in the kit. Although some sources claim that the Wing Mfg. kit is $\frac{1}{8}$ scale, it is actually $\frac{1}{10}$. This makes it easy to convert dimensions from the full-size B-25.

SERVO MOUNTING

The turret assembly is mounted directly on an output wheel on a 180-degree servo. The 180-degree servos that are readily available are designed to operate retractable landing gear and have only two positions, with nothing in between. I used an electronic device available from Robin's Hobbies in Glendale, CA, to convert a standard servo to 180-degree operation. The servo is attached



The character of a WW II bomber is defined by its turrets. The stock pieces on the Wing Mfg. Pro Series B-25 were OK, but to make the model really stand out, the turrets needed some extra detail.



To make the model more realistic, the guns were modified so they were adjustable for elevation. A servo under the turret allows it to be rotated 180 degrees via RC.



This model is patterned after one of the last PBJ-1Hs built, so the top turret was altered to simulate an armor plate in place of the rear glass panel.

A closer look

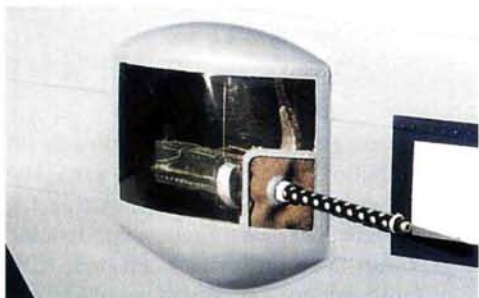
The Bendix Model R (Army model A913) upper turret was an amazing piece of machinery. The clear canopy that enclosed the gunner and his twin .50-caliber M-2 machine guns consisted of molded Plexiglas sections outside each gun, with three panels of glass forming the center section in between the guns. On later models, the rear glass panel was replaced with armor plate. The gunner never had to worry about shooting his own tails, propellers, or tail gunner when tracking an enemy aircraft because the turret incorporated a profile cam and microswitch mechanism that interrupted fire if the gun was pointed at a part of its own aircraft. The system worked independently on each gun, so even if a part of the aircraft blocked one gun, the other gun continued to fire (if it was clear).

As an extra precaution, two small, armored plates were placed at 45-degree angles on top of the fuselage to the rear of the turret to deflect any bullets away from the tail gunner's position. These plates were mostly cosmetic, and it's quite possible they never deflected any bullets, but they were reassuring to the plane's crew.

The gunner sat on a bicycle seat and controlled the turret with a dual-handgrip controller. Holding the handgrip depressed safety switches that activated the turret and allowed the trigger switches to fire the guns; both fired if either of the two triggers was pressed. The controller could be rotated in both azimuth and elevation, and a push-button switch on top of the handgrips changed the rate of rotation from 0 to 12 feet per second to 0 to 33 feet per second. The farther the controller was rotated, the faster the turret turned or elevated the guns. The electrical circuit automatically compensated to prevent any change in turret speed because of a change in the loads on it. Intercom switches were placed within inches of the handgrips, and the guns could be charged by the gunner using the top of his foot to raise his footrest and then lower it again. The Bendix engineers thought of everything to keep the turret operating as efficiently as possible in combat.



Clear blisters for the waist guns are provided in the kit. The author used wristwatch bands to simulate the ammunition feed chutes.



Above: the fuselage was widened and deepened in the tail to match the shape of the full-size B-25. Olive-brown fabric CA'd to a plywood frame re-creates the look of the original canvas tail-gun cover. Left: thin plastic sheeting and wood were used to detail the tail-gunner's position. A ball-and-socket fixture from a dental lab allows full rotation of the twin guns.

to a homemade plywood servo mount that I placed on bulkhead 176A with two wood screws that are accessible through the bomb-bay doors. This allows the turret to be easily removed and provides additional access to the forward section of the fuselage.

FINISHING TOUCHES

I built my PBJ-1H (Navy version of the B-25H) without simulated gunners in the turrets because during takeoffs and landings, the gun and nose positions on bombers were never manned, in case of an accident. Your model is nearest the flight judges during takeoffs and landings, and they shouldn't see any figures where they wouldn't have been on a full-size aircraft. The H model of the Mitchell is unique in the B-25 series in that it lacked controls for



a copilot. That is why there is only one pilot figure in my PBJ.

To make the tail turret-guns movable, I obtained from a local dental lab an articulated fixture that is used to connect the top and bottom of plaster teeth casts. It is

light, and it has a ball-and-socket joint that is ideal. The canvas cover is olive brown fabric. I formed it into a cone shape by bonding the overlapping edges with thick CA. I then soaked the fabric with water, wadded it up into a ball and let it dry. When spread out and CA'd to a plywood frame, the fabric wrinkles realistically. This

assembly is then slipped over the tail guns and press-fit into the hollowed-out balsa structure that forms the rear of the fuselage.

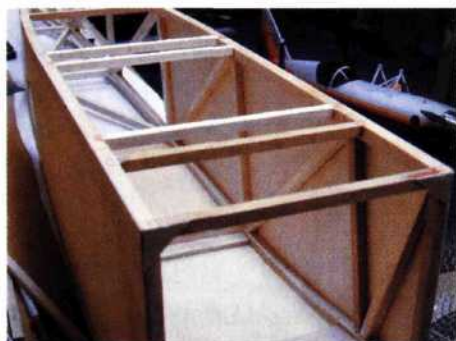
Building a WW II bomber is a challenging project for any RC modeler. Taking the extra time to make realistic and operational turrets is time well spent and results in an aircraft that really stands out in a crowd. ✦

Dremel Tool, 4915 21st St., Racine, WI 53406; (414) 554-1390; fax (414) 554-7654; www.dremel.com.

Wing Mfg., 306 E. Simmons St., Galesburg, IL 61401; (309) 342-3009; www.wingmfg.com.



Splicing wood and other construction techniques



Here's the basic framework for my 1/3-scale Pietenpol Aircamper's fuselage. Because they are more than 70 inches long, the main longerons had to be spliced together before I could assemble its sides.

that 48-inch-long sticks were available only by special order. I said that I regularly splice my stringers and spars and think nothing of it. "But how do you do it safely?" he asked.

For this column, let's discuss some common construction techniques and how wood splicing should be done.

STRONG SPLICES

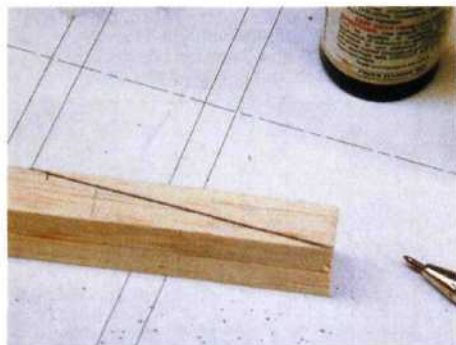
When you want to turn two pieces of wood into one, you can't simply glue them together. Some cutting and fitting is necessary so that the splice will bear as much stress as the original wood pieces. To accomplish this, you have to increase the gluing area for the splice by cutting the two mating surfaces in a diagonal line.

The weakest, least supported joint you can make is a simple butt joint. Gluing two pieces of wood together end to end provides very little surface area for the glue. Overlapping the two pieces is a much stronger way to join them, but if you want to use the part as a stringer or a spar, the overlap isn't practical because the pieces are not attached in a straight line. A diagonal splice keeps both pieces in alignment. As a general rule, I make

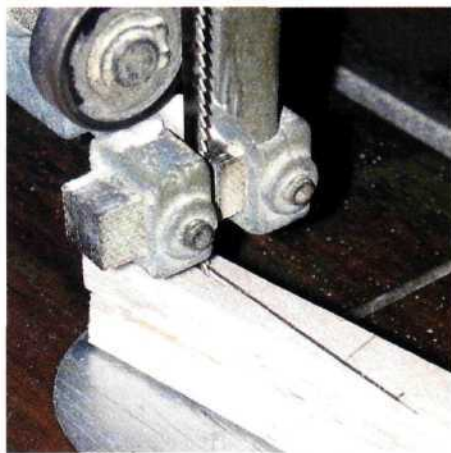
I was sitting under a shade tent at a giant-scale fun fly recently when someone asked me where I got the longer-than-standard-size materials I use to build my big airplanes. I didn't know what the fellow meant. He told me that his local hobby shop carried only 36-inch lengths of balsa and spruce, and



1 Start by tack-gluing the two pieces to be spliced together with CA and kicker. Use just a couple of drops of glue.



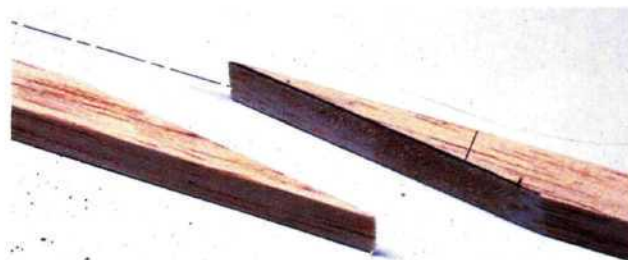
2 On the ends of the pieces, draw a diagonal line that's about six times as long as the pieces are thick.



3 Cut the diagonal splice with a band saw, and make sure the cut is square to the top edge.



4 Sand the cut edges smooth with a belt sander.



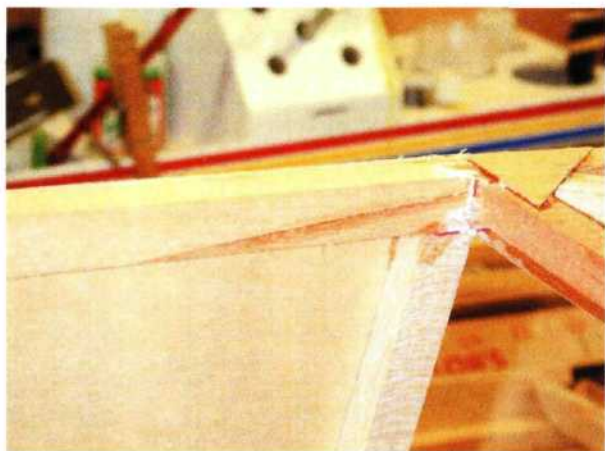
5 Here, the two longerons are ready to be glued together.



6 I use this simple jig to keep the pieces in alignment while the glue dries.



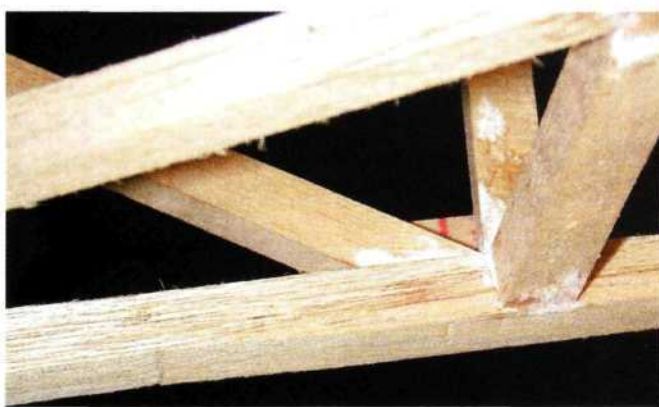
7 The finished splice.



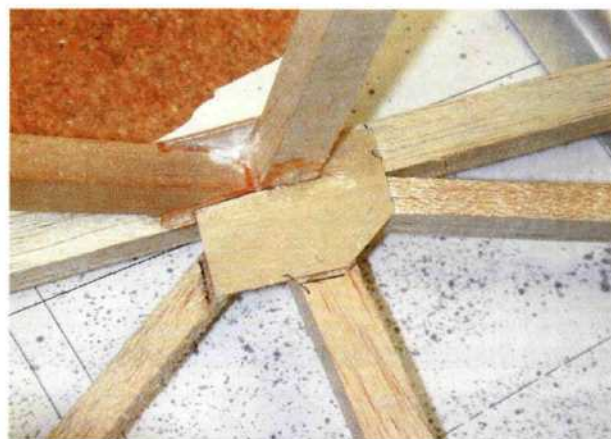
8 For additional strength, I positioned the splice against the plywood side sheeting.



10 By increasing the gluing area that holds the joints together, these 1/32-inch gusset plates add strength to an already strong fuselage structure.



9 Here you see the splice positioned close to a cluster junction where other fuselage members join.



U This is a close-up of an internal gusset plate used to strengthen a lower fuselage longeron. These are used when you want to keep the outer surface of a joint flush.

the length of a splice at least six times the thickness of the material being glued together—roughly 3 inches across for a 1/2-inch-square spar.

To make the two pieces match precisely, I first tack-glue the two parts on top of each other with a few drops of thick CA while making sure the edges of each stick are flush. I then draw a straight diagonal line at the ends to be joined (see photos). I use my band saw to make the cut, and I make certain it is square to the top edge. I then sand the cut surfaces (still glued together) smooth with a belt sander. When the two parts are separated, the two angled surfaces match perfectly.

To keep the two pieces aligned when I glue them together, I use a simple, wooden alignment jig. The jig is made with a flat base and two guide pieces (rails) glued on top that form a space between them that's the same as the thickness of the pieces being glued together. For the jig shown here, I used pieces cut from an old yardstick to act as rails. I also use a piece of Great Planes' Plans Protector

material to prevent the parts from being glued to the jig when the adhesive oozes out of the joint.

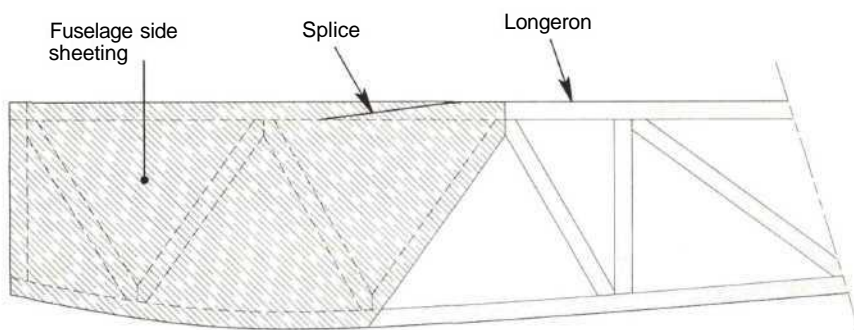
To form the glue joint, I place one piece in the jig and spray it with a light mist of kicker. I then apply CA to the second piece and slide it into the jig and up against the first piece. After the glue has set, I use a sanding block to sand the face

of the joint smooth. I then turn the part over and sand the opposite face smooth as well. That's it. No magic—just a very strong joint.

JOINT REINFORCEMENT

For most model structures, the diagonal joint splice will be more than strong enough all by itself. But if you don't

Figure 1. Splice location

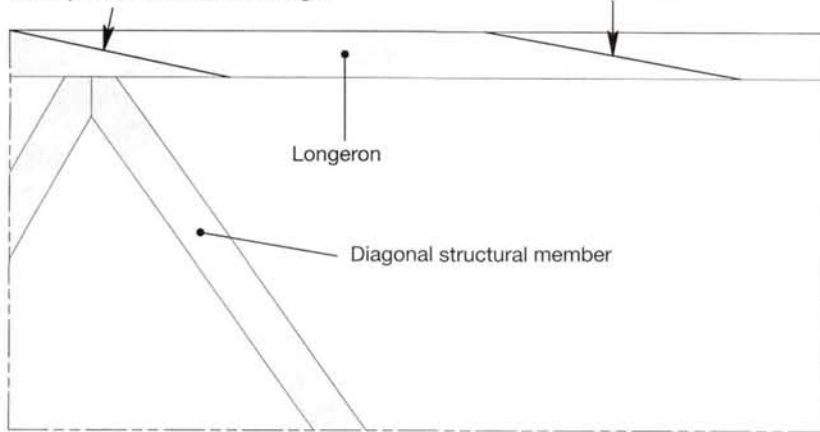


You can safely place a splice on a longeron or vertical fuselage member anywhere against the fuselage side sheeting. The sheeting will act as a large gusset plate to reinforce the splice.

Figure 2. Open splices

Placing a splice at a cluster junction where several structural members meet provides additional strength.

An unsupported splice has less strength.



trust it, you can easily place the joint in an area where surrounding sheeting or other structure members will help to support it. Typically, with a fuselage longeron, you can place it so that the joint is glued against a flat fuselage side. In stick construction, you can place the joint at a junction cluster where vertical and diagonal members meet (see illustration). It is also a common practice to strengthen these areas with thin plywood gusset plates. In a wing spar, the LE or TE sheeting can add gluing area, or you can attach front and back gusset plates around the glue joint. So the next time you need a 70-inch-long fuselage longeron, don't sweat it—splice it!

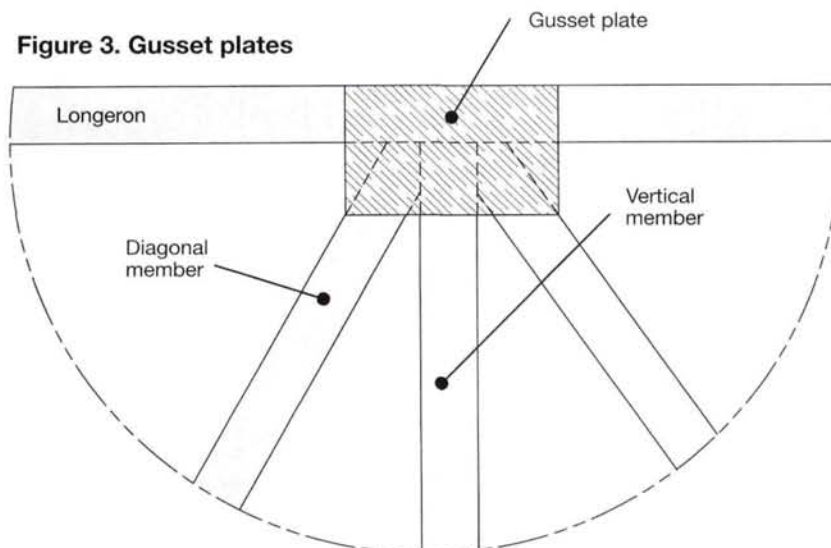
GUSSET PLATES

Gusset plates add much strength to glue joints by increasing the surface area for

the glue to penetrate. It is often the case that when a wooden structure is damaged in a crash, it is the wood itself that breaks, not the glue joints. The gussets don't have to be very thick to do their job. For airplanes as large as 1/3 scale, 1/32-inch-thick ply will be more than adequate. Gussets made from 1/32-inch ply can easily be cut with a pair of scissors, and they can be attached to the structure with quick-setting CA glue. Even though the gussets are light, I don't make them much larger than three or four times the thickness of the parts I am gluing together.

Cut the gussets to shape, position them on the structure and use a pencil to mark guidelines for applying the glue around them. Apply

Figure 3. Gusset plates



By increasing the glue area, gusset plates add strength to structural joints.

glue to the framework and then mist the gusset with kicker. Placing the gusset into position over the joint then "kicks" off the CA glue and greatly speeds construction. The photos show several gusseted joints that were used in my 1/3-scale Pietenpol Aircamper project.

SPRUCE GLUE

Spruce is often used for stringers, longerons and spars in giant-scale planes. It's easy to cut and shape, readily available and can often be used in place of more expensive balsa stock if you reduce its dimensions to save weight. I have used CA to glue spruce, but its tight grain often doesn't allow CA to penetrate completely. For this reason, I use slow-setting epoxy and aliphatic resin. Some relatively new aliphatic glue I have found is Elmer's exterior-grade carpenter's glue. This glue is darker than interior-grade glue and is much thicker. The label says it has a "gel" formula, and I think it is very good for gluing spruce as well as other hardwoods and plywood for model use. You do have to lightly clamp together the parts being bonded,



My newest discovery for gluing spruce and other hardwoods together: Elmer's exterior-grade carpenter's wood glue. Works great!

but the glue is very inexpensive and is readily available at most hardware stores. Give it a try and save some construction dollars.

That's it for this month. If you have any comments or questions regarding giant-scale wood construction, send them to me c/o Model Airplane News, 100 East Ridge, Ridgefield, CT 06877-4606 USA, or email me at gerry@airage.com. ✈





Saito FA-72

If power-to-weight ratio means anything at all to you (and since we in the airplane world are talking wing loading and thrust, it certainly should), then I want you to take a close look at this latest offering from Saito: the FA-72. According to factory specifications, this new engine weighs in at 16.6 ounces with muffler, which is very

POWER-TO-WEIGHT WIZARDRY

So how did Saito accomplish this breakthrough in power-to-weight ratio? I've had excellent luck with Saito engines manufactured over the past six or seven years; I own many of them. One thing that has slightly puzzled me over the years, however, is the seemingly arbitrary use of

technologies gives Saito considerable marketing and manufacturing versatility with a single cylinder/head casting. Perhaps the company has had its reasons for using both technologies all along. Accordingly, Saito has taken its FA-65 cylinder/head casting, removed the brass liner and directly chrome-plated the inner finished surface of the aluminum cylinder casting. In doing so, Saito has instantly increased the FA-65's bore from 24.8mm to 27mm.

THE STROKE STORY

The other half of the story—the stroke—was not as simple a task as the bore. To keep the FA-72's crankcase small enough to fit in the FA-56's bolt pattern and to arrive at a size targeted right in between the FA-65 and FA-80 (.72ci), the FA-65's stroke had to be reduced from 22 to 20.6mm. Had Saito stayed with the FA-65's stroke, the engine's displacement would have been very close to .77ci. To leave the stroke as it was would not only have left the engine as heavy as the FA-65 because of its larger crankcase size but would also have put the engine's displacement far too close to the existing FA-80 engine. As it turns out, the FA-72's stroke is 1.6mm longer than that of the FA-56, which is 19mm. What this all adds up to is an engine whose bore and stroke can be characterized as quite "over-square." That means the bore is markedly bigger than the stroke—27x20.6mm.

RUNNING AND PERFORMANCE

I found the FA-72 to be a rather low-vibration engine, considering it's a single-cylinder design, and this may be due, in part, to the relatively short-stroke configuration. Over the years, I have noticed that many short-stroke engines tend to fare a bit better in terms of vibration than longer-stroke engines. In a single-piston engine, the degree to which you can perfectly balance the engine is limited. For example, if you run a long- and a

light for a .72ci displacement 4-stroke engine. Consider this: the weight of the FA-72 is a mere 1.1 ounces more than the FA-56; 2.8 ounces less than the smaller displacement Saito FA-65, and an impressive 3.7 ounces less than the smaller displacement O.S. FS-70 II Surpass. On my electronic measuring equipment, I found the weight of the FA-72 even a bit more favorable at 16.27 ounces. Either way, this engine is light for its size; moreover, it will fit into the spot where an FA-56 once sat (since it has the same mounting-bolt pattern as that smaller engine). This also means that you can easily stuff the large-prop-turning power of a .72-class 4-stroke engine into a .40-size airplane. That's what I plan to do with my FA-72.

both chrome-plated brass cylinder liners and chrome plating applied directly onto the aluminum of the cylinder casting. Both methods have worked well for Saito, but I give the nod to applying the chrome plating directly onto the aluminum, as I feel this supplies better heat transfer and cooler running. Eliminating the brass liner also saves weight. Maybe using both lined- and non-lined-cylinder



Although the FA-72 has the same mounting-bolt pattern as the FA-56 (right), you need to be aware of differences in their dimensions. Most important, the FA-72's crankcase is 2.84mm wider than the .56's. The .72 is also 6.91mm taller, measured from the crankcase bottom to the valve-cover top, and it's 4.31mm longer, measured from the backplate to the thrust washer.

SPECIFICATIONS

Engine: Saito FA-72
Distributor: Horizon Hobby Inc.
Displacement: .72ci
Horsepower: 1.2 @11,000rpm
Bore: 27mm
Stroke: 20.6mm
Piston/sleeve: AAC w/ring
Weight: 16.6 oz.
Width: 56.11mm (from outer mounting lugs)
Height: 109.47mm
Shaft diameter: 8mm
Street price: \$224.99; \$249.99 (Golden Knight)

Hits

- Excellent running characteristics.
- Lightweight.
- Good power.
- Good workmanship.
- Included tools.

Miss

- Included glow plug not up to industry standards.

TEST WEATHER CONDITIONS

Relative humidity: 78%
Temperature: 71 degrees
Barometric pressure: 29.92 in.
Fuel: Wildcat Premium Xtra 15% nitro,
 18% oil (80/20 synthetic/castor)
Glow plug: O.S. "F"

RPM PERFORMANCE

Prop	Rpm
Kyosho 11x7	11,590
APC 12x6	10,920
APC 12x7	10,440
APC 12x8	9,490
APC 13x6	10,220
APC 13x7	9,790
APC 14x6	8,630
APC 14x7	7,790

All tests were performed using Wildcat 15-percent-nitro Premium Xtra fuel with 18-percent synthetic/castor (80/20) blend.

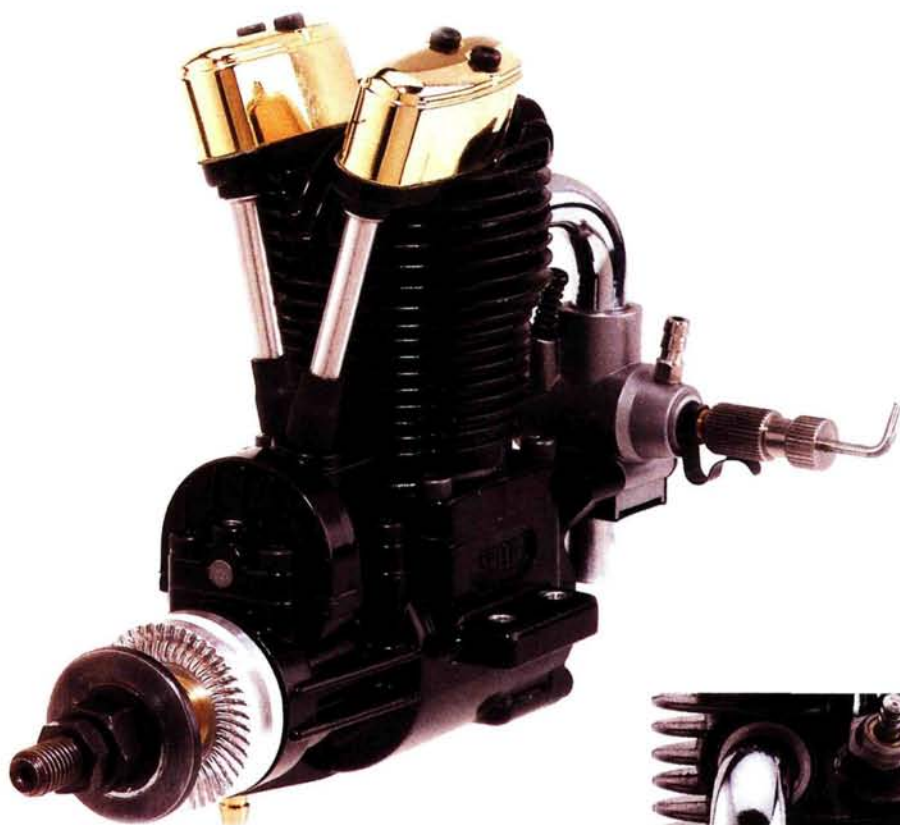
short-stroke engine at the same rpm (both having pistons of equal mass), the long-stroke engine's piston will have to move faster than the short-stroke engine's. The greater the piston speed, the greater the inertia. To offset this increased force of inertia, a bigger counterbalance is required to keep things smooth. And this is where you can run into problems with single-cylinder model engines; you can run out of room for the counterbalance. I may get letters about the preceding statement, and

that's OK; that's part of what this magazine thing we do is about. However, the fact that the FA-72 has a larger piston but a smaller counterbalance than the FA-65 is certainly strong evidence that I'm not completely out to lunch here. In addition, short-stroke engines have lower rod angularity, which can further smooth things out.

At any rate, the FA-72 is one nice-running engine with very non-critical main-needle characteristics. I was able to get a solid 1,900rpm idle on a 13x6 prop using an O.S. "F" glow plug. The very best I was able to do with the supplied glow plug on the same prop was 2,300rpm. Needless to say, I tossed the stock plug in favor of the O.S. "F" plug. All break-in (two 12-ounce tanks at 4,000 to 5,500rpm) and high-speed rpm readings were done running on Wildcat 15-percent-nitro Premium Xtra fuel, which contains 18 percent oil (80/20 synthetic/castor blend). I still like a bit of top-grade castor for guarding the low end against corrosion; call me old-fashioned.

As you can see, figures such as 10,440rpm on a 12x7, 10,220 on a 13x6,

The carburetor is Saito's tried-and-true twin-needle type. Throttle response is very good, and a reliable idle of 1,900rpm was achieved using an O.S. "F" plug. The main needle adjustment was very non-critical—a cinch to adjust.



and 9,790 on a 13x7 are not bad for a 16.6-ounce engine. Saito has used some existing parts and a lot of engineering creativity to set a new standard of power-to-weight ratio in the 4-stroke market. ✦

O.S.; distributed by Great Planes Model Distributors Co., P.O. Box 9021, Champaign, IL 61826-9021; (800) 682-8948; fax (217) 398-0008; www.osengines.com.

Saito; distributed by Horizon Hobby Inc., 4105 Fieldstone Rd., Champaign, IL 61822; (877) 504-0233; www.horizonhobby.com.

Wildcat Fuels, 3005 Park Central, Unit T, Nicholasville, KY 40356; (606) 885-5619.

PRODUCT WATCH

Latest product releases

AT **MODEL AIRPLANE NEWS**, we not only tell you what's new, but we also try it out first to bring you mini-reviews of the stuff we like best. We're constantly being sent the latest support equipment manufacturers have to offer. If we think a product is good—something special that will make your modeling experiences a little easier or just plain more fun—we'll let you know here. From retracts and hinges to glow starters and videotapes, look for it in "Product Watch."

JERSEY MODELER Fuel Cans

These three new fuel cans were created by Dean Kraus of Jersey Modeler; he designed them for active modelers who want trouble-free fuel pumping at the field. You can choose between a hand-



crank pump or an electric pump; the electric unit includes batteries.

When Dean takes your order, he asks how you intend to use the tank because he color-codes them for fuel type; the blue can is for kerosene fuels used in turbine-powered jets, and the red can is designated for glow fuel or gasoline. I chose a hand-crank pump for my gasoline can and electric pumps for my glow and kerosene fuel cans.

The cans are available in 2- and 4-gallon sizes, and they can be ordered with a custom name label so no one inadvertently walks away with your fuel can. The cans come with Du-Bro fittings, and the overall quality of these units is top-shelf. A return line for overflow is included to prevent spills or wasted fuel.

I really like the Jersey Modeler fuel cans. They cost between \$49.95 and \$99.95 and are among the best fuel cans I have ever used. —George Leu

Jersey Modeler, 2012 Champlain St., Toms River, NJ 08757; (732) 240-0138; fax (732) 505-8968; www.jerseymodeler.com.

W.S. DEANS CO.

Speed Jig

Adjustable battery jig

If you have ever tried to build your own battery pack by soldering single cells together, then you know that having only two hands is not enough. You need two hands to hold the soldering gun and solder, you need two more hands to hold the cells together, and you need yet another hand to hold the soldering bar that connects the cells! I've made wooden jigs and makeshift "third-hand" clamping fixtures to help me accomplish the task, but in the end, I've always thought there has to be a

better way.

And there is!

The Speed Jig from the clever folks at Deans is a simple-to-use holding fixture that accommodates up to 6 standard sub-C cells. The jig is molded from



a strong, heat-resistant plastic, and it has a removable front section that both holds the cells securely in place and allows the finished pack to be easily removed. The jig has a leaf-spring-loaded hold-down clamp that securely holds the solder bars in place while you are soldering. The clamp can slide back and forth on a guide rail and is

very easy to position.

With the new Speed Jig, I found that I can solder together a pack in about 1/4 the time it took without it. For best results, you should use a high-wattage soldering iron to solder the bars into place. The lower the wattage, the longer it takes to make a solder joint, and this allows more heat to be transferred to the bar and the clamping arm. I consider a 40W iron the minimum for the job.

Priced at \$14.95, the Deans jig is a great investment for anyone who wants to build his own battery packs. —Gerry Yarrish

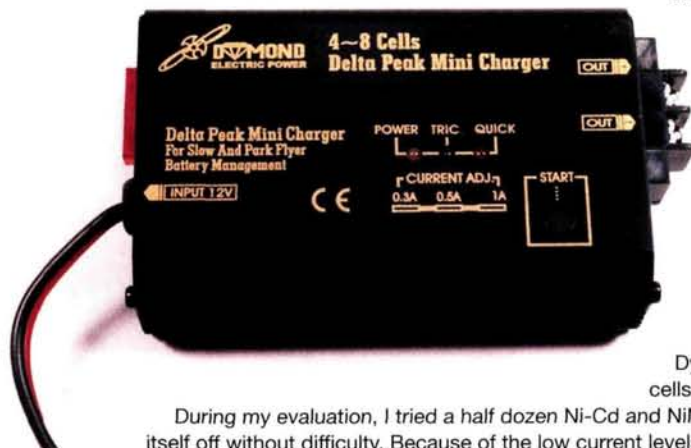
W.S. Deans Co., 10875 Portal Dr., Los Alamitos, CA 90720; (714) 828-6494; fax (714) 828 6252; www.wsdeans.com.

DYMOND MODELSPORT USA

Delta Peak Mini Charger

Small-cell care and feeding

Based on the success of the Xing peak-detect charger, Dymond Modelsport has just introduced a new charger specifically for use with the small, low-capacity battery packs (50 to 600mAh) found in most micro flyers. It's called the Delta Peak Mini Charger, and it is built with the same 4-inch case as the Xing, though it is black to help differentiate it from the red Xing. Dymond chose charge current rates of 0.3 amp (300mA), 0.5 amp (500mA) and 1 amp (1000mA) to better suit small-capacity cells. The Mini is also able to charge 4- to 8-cell battery packs (one more cell than the Xing).



Both chargers are operated as follows: attach it to a 12V DC power source, which lights the yellow LED. Two screw terminals allow the attachment of just about any battery cable; one with a Tamiya connector is supplied. When you connect a battery to the output, a green LED will light to indicate that the charger is now in trickle mode (10 to 20mA charge rate). Press the start button to initiate fast charging, at which point the red LED will light. When the battery is fully charged, the Mini will shut down automatically (the red LED goes out), and the trickle charge takes over.

The single most important thing is to select the correct charge current to match your battery. If you select too low a current, the charge time will be excessively long. Selecting too high a current can damage your battery.

Dymond recommends 0.3 amp for 110mAh cells, 0.5 amp for 250 to 350mAh cells and 1 amp for 500 to 800mAh cells.

During my evaluation, I tried a half dozen Ni-Cd and NiMH battery packs. Every one reached peak voltage, and the charger turned itself off without difficulty. Because of the low current levels, the Mini barely got warm during any charge session.

The Delta Peak Mini is simple and reliable; I'm making this one a keeper for my flight box. And at \$34, it is an excellent value.

—Bob Aberle

Dymond Modelsport USA, 683 W. Main St., Oshkosh, WI 54901; (920) 303-1100; fax (920) 303-2021; www.rc-dymond.com.

DAVE PLATT MODELS

Black Art Videos

"The Jet Set"

Dave Platt is famous for his long and impressive involvement in scale aircraft modeling. After a lifetime of developing his craft, Dave gives us his secrets, tips and techniques for building museum-scale-quality RC airplanes in the form of his "Black Art" series of videotapes. From selecting a subject aircraft, finding 3-views and engineering strong structures and subassemblies to building and detailing models, Dave covers every aspect of this rewarding pastime. With "The Jet Set," Dave adds a new entry to the Black Art library and shows the complete construction of his second turbine-powered Hawker Hunter.

This five-tape series begins with some explanations of the lessons learned from the loss of his first Hunter and includes an impressive and sobering scene of the first jet's crash. Bench work begins then with a discussion of a typical turbine-power system and how all the parts will fit into his model. The tape also includes construction details of the redesigned horizontal stabilizer and elevator control system and how to make a fiberglass fuel tank. Volume 2 highlights the fabrication of the fiberglass air-intake trunk, the basic fuselage construction and planking and the turbine engine installation. As usual, Dave builds his model on a glass tabletop.

Volume 3 shows in great detail Dave's well-thought-out technique for making a scale cockpit interior for the Hunter. Also included are details for the sliding canopy, instrument hood and panel, making instrument bezels and surrounds and the intricately detailed ejection seat and



launch rail. This tape is a very useful reference for anyone who builds scale models and wants the ultimate in cockpit detail. I especially liked the segment on drawing your own enlarged instrument faces on drafting Mylar and having them photo-reduced in negative format to produce crisply detailed miniature black-faced instruments with white numbers.

Volume 4 deals with the construction of the large turbine access hatch, completing the fuselage and the beginning of the wing construction. Details are shown for building the split flaps out of G-10 fiberglass material and carbon-fiber arrow-shaft material and hinging the flaps into place so the wing sheeting and trailing edge can be completed. Also shown are outer wing panel construction and plug-in wing tube installation, and nose gear and main retractable landing gear installations.

Volume 5 ends the series and shows great close-ups and an explanation of the final surface detailing and painting of the model. Dave demonstrates panel line and raised hatch repli-

cation and talks about masking off areas so you can create raised fairings with several applications of paint. Weathering techniques are also described. The tape concludes at the flying site with Dave showing the turbine engine being started and run for the first time while addressing safety issues for turbine-powered models.

Each video runs for approximately 2 hours. Each tape volume is available individually, but you can save a little money by purchasing the series all at once. The first tape costs \$34.95; additional tapes (if ordered together) are \$30 each—perfect for the modeler who wants to learn more about scratch-building turbine-powered jets, or for anyone who wants to learn more about scale model-building techniques. "The Jet Set" is an investment in high-quality instruction. —Gerry Yarrish

Dave Platt Models, 1306 Havre NW, Palm Bay, FL 32907; (407) 724-2144; www.daveplattmodels.com. ✦

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[4/02]

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Ace Hobby Dist., C4, 90-91	Du-Bro Products, 75	Richmond RC, 64-65
Aeroloft, 138	Dumas, 116	RC Showcase, 154
Aerospace	Dymond	RCStore, 180-183
Composites, 138	Modelsports, 127	RCV Engines Ltd., 151
Aerotech Models, 144	Ebay, 23	RK Engineering, 168
Aerotrend, 160	E-Flite, 21	RobertMfg., 163
Aero Electric, 116	Electric Aero Modeling, 175	RTL Fasteners, 176
Airborne Leathers, 111	Electro Dynamics, 116	Sheldon's Hobbies, 167
Airborne Video Systems, 146	Epic RC, 175	Sidewalk Flyers, 166
Air Foil Aviation, 164	Eurokit Worth America, 138	Sig Mfg., 113
Air Magic, 170	F&M, 166	Sky Hooks & Rigging, 40
AirBorne Models, 42-43	Falcon Trading Co. Inc., 40	SKS Videos, 176
Airtronics, C3	Fiberglass	Slimline Products, 12
AirWild, 129	Specialties, 177	Smiley Antenna Co., 125
America's Hobby Center, 139,155	Flight Line Toys, 144	Smithy Co., 166
Applied Design, 154	FMA Direct, 165	Soarsoft, 170
Arizona Custom Builders, 169	Fox Mfg., 29	Speedtech Instruments, 176
Arizona Model, 56	Futaba, 4, 66	Spin Master Toys, 41
Autogyro, 178	FTE (Frank Tiano Enterprises), 171	Stalker Radar, 175
BMJR Model Products, 154	G&P Sales, 179	Sullivan Products, 13
Backyard Flyer subscription, 147	Giantek, 178	Swanson Associates, 178
Bob Smith Industries, 57	Global Hobby Dist., 3, 15	Sweepstakes, 130-131
Bob Violett Models, 179	Great Planes, 5, 20, 49, 73,109	T&D Sales, 169
Bruce Tharpe Engineering, 178	Hayes Products, 164	Tekoa, 160
Bruckner Hobbies, 137	Heritage R/C, 168	TNC Electronics, 168
Cactus Aviation, 169	Herr Engineering, 9	TNT Landing Gear, 179
Carlson Engine, 144	Hi-Country Hobbies, 28	Top Flite, 85
Castle Creations, 63	Hitec RCD, 39, 97	Tower Hobbies, 114,132-136,153
C.B. Tatone, 146	Hobbytime, 161	Toytronix LLC, 125
Century Helicopter, 83	HobbyTown USA, 125	Trick R/C, 67
Century Jet Models, 160	Hobby Hanger, 178	Tru-Turn, 179
Cermark Models, 149	Hobby Horse, 100-101	Tuf Flight, 176
Chase Durer, 25	Hobby Lobby Intl., 122-123	Turnkey RC, 166
Chief Aircraft, 58-59	Hobby People, 88-89	Ultra Precision, 171
Cleveland Model & Supply Co., 160	Horizon Hobby Inc., 6-7, 92-93	Universal Laser, 166
Cyberbond, 162	HPS, 169	Upperspace, 157
D&L Designs, 178	JHM Aero Engineering, 171	Vintage RC Plans, 178
Dave Brown, 164	JK Aerotech, 160	Vinylwrite Custom Lettering, 169
Dave Gierke, 173	JR, 11,27	Windsor Propeller Co., 144,175
DJ Aerotech, 170	K&S Engineering, 170	Wing Mfg., 168
		Yellow Aircraft, 148
		Zap, 17

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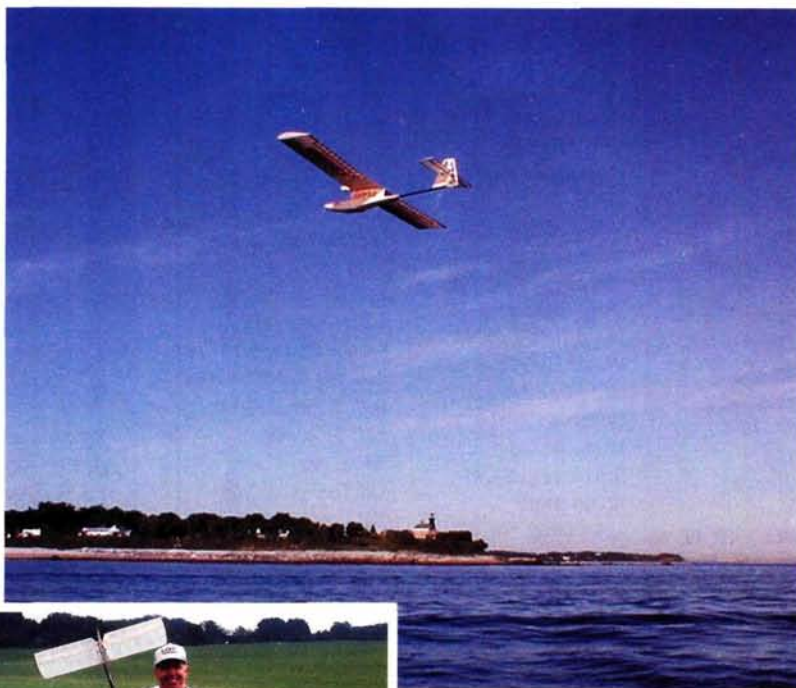
Electric model crosses Long Island Sound

In the early hours of July 7, 2001, X-Sounder, an electric-powered seaplane model, successfully completed a one-way trip from the Connecticut shore to Port Jefferson on Long Island, NY. The nearly 16-mile trip took almost 40 minutes, during which the model was "chased" by a small boat with Mario DiDiego, videographer; Tom Hunt, piloting the plane; and, of course, the boat's skipper, Bob Erbe. Not so high above, pilot Clyde Giest and photographer Henry Prew chased the model in a full-scale Cessna 172.

Although Frank Dellamura and Tom Hunt had designed the X-Sounder, its design evolution, fabrication and flight were the joint effort of 10 members of the Silent Electric Fliers of Long Island (SEFLI) model aircraft club. Our effort began in earnest early in 2001. A design team of mostly retired aerospace engineers, including Henry Prew, Nick Danneffer, Mario DiDiego, Frank Bock, Frank Dellamura and Tom Hunt, studied many schemes, with single- and multi-engine designs, single hulls with sponsons or wing floats, twin hulls and many others flying off the drawing board. The final design was agreed upon in March, but provisions in the design allowed easy modifications, if necessary.

By June 2001, builders Bob Bohrer, Jim Reid and Tom Hunt had the model ready to test-fly. Many flights over land with downlinked power data (current and voltage) and a hand-held global positioning satellite temporarily installed in the model confirmed its ability to make the 14-mile, nonstop flight across the Sound. During the test-flight phase, the limited (but essential) data available showed that major changes to the airframe were required to increase the model's range. These changes were instituted and tested, and when the overland range consistently reached 16 miles, the model was ready for the "crossing."

The flight/boat crew did not have to wait long for good crossing weather. Saturday, July 7—only three days after the last



SPECIFICATIONS

Model: X-Sounder

Type: seaplane

Wingspan: 100 in.

Wing area: 1,500 sq. in.

Weight: 7 lb.

Drive system: direct-drive Aveox 1415-4y; Schulze 55bo sensorless ESC; APC 14x7 prop cut down to 12.5 in.; and 14 Panasonic 3000 NiMH cells

Onboard accessories: Super Circuits PC87 miniature video camera and transmitter using 8-cell, 600mAh and 6-cell, 1600mAh NiMH packs; and 4-cell, 1000mAh receiver pack

Takeoff motor current: 34 amps in-flight cruise current/voltage: 3.5 amps/15.5 volts (measured by a downlink wattmeter designed and built by Frank Bock)

Cruise speed: approx. 20mph

Flight time: approx. 45 min.

overland flight trials—was nearly perfect. Shortly after 5 a.m., the model took off from just inside the jetty that separates Port Jefferson harbor from Long Island Sound. Due to a 4mph headwind present even at that early hour, X-Sounder fell short of its goal of completely crossing the Sound; it had to be landed a mere ½ mile from shore because the motor battery was depleted. Undaunted, the crew replaced the motor pack with a fresh one and moved the boat as close to shore as possible. The model took off and headed toward the Connecticut coastline, where it turned 180 degrees and headed back to Long Island.

Approximately 30 minutes later, the model reached the Long Island shore, and the crew decided to continue the journey into Port Jefferson harbor and back to the boat ramp (nearly 2 additional miles). Passing a small Navy destroyer tender and a Bridgeport/Port Jefferson car ferry, X-Sounder easily found its way to the head of the harbor. After making a few victory laps around the docks, the model landed a few

short yards away from the boat ramp from which it had departed—a distance of 15.7 miles! Efforts are under way to modify X-Sounder to make a complete roundtrip without landing and recharging. ✦

[Editor's note: look for a feature article on this design in an upcoming issue of *Model Airplane News*.]